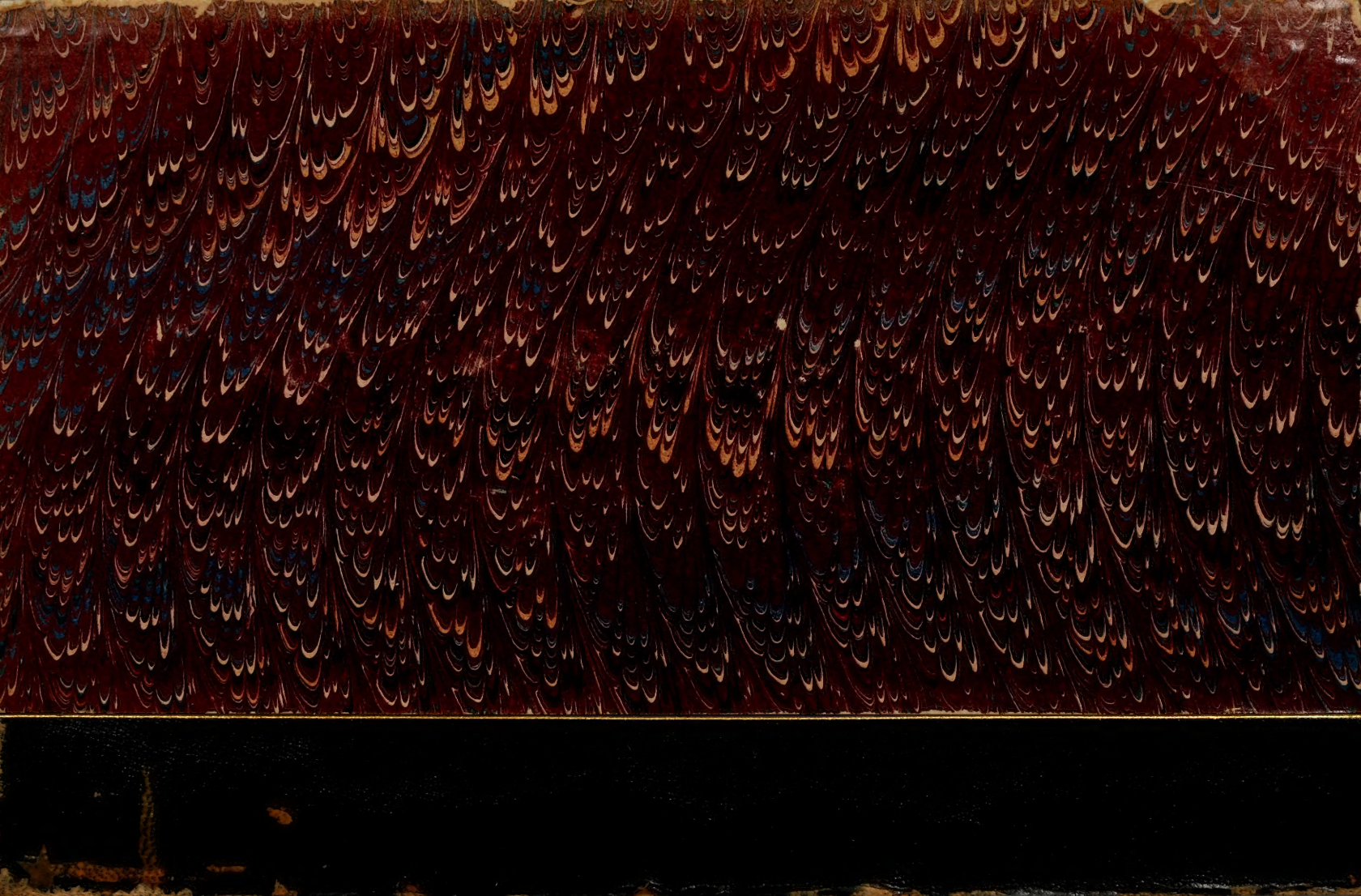
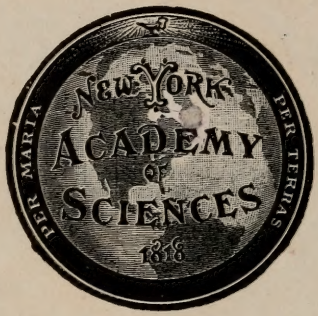




Library

THE CANADIAN

ENTOMOLOGIST.

VOLUME XXV.

EDITED BY THE

Rev. C. J. S. Bethune, M. A., D. C. L.,

PORT HOPE, ONTARIO.

ASSISTED BY

J. Fletcher, Ottawa; H. H. Lyman, Montreal, and Rev. T. W. Fyles, Quebec.

London, Ont.:

LONDON PRINTING AND LITHOGRAPHING CO.

1893.

ENTOMOLOGICAL SOCIETY OF CANADA LIBRARY

A 307

OTTO

LIST OF CONTRIBUTORS TO THIS VOLUME.

AARON, DR. E. M.....New York.
ALDRICH, PROF. J. M.....Brookings, South Dakota.
ASHMEAD, W. H.....Washington, D. C.
BANKS, NATHAN.....Sea Cliff, N. Y.
BEAN, T. E.....Laggan, Alberta.
BETHUNE, REV. C. J. S. (The Editor).....Port Hope.
BLATCHLEY, W. S.....Terre Haute, Indiana.
COCKERELL, T. D. A.....Las Cruces, New Mexico.
COQUILLETT, D. W.....Los Angeles, Cal.
DAVIS, W. T.....Staten Island, N. Y.
DYAR, HARRISON G.....New York.
EDWARDS, W. H.....Coalburgh, West Va.
EHRMANN, G. A.....Pittsburgh, Pa.
ELWES, W. J.....Colesborne, England.
FELT, E. P.....Ithaca, N. Y.
FERNALD, PROF. C. H.....Amherst, Mass.
FIELD, W. L. W.....Guildford, Conn.
FLETCHER, JAMES.....Ottawa.
FORD, A.....St. Leonards, England.
FOX, W. J.....Philadelphia.
FRENCH, PROF. G. H.....Carbondale, Ill.
FYLES, REV. T. W.....South Quebec.
GIBB, LACHLAN.....Montreal.
GILLETTE, C. P.....Fort Collins, Colorado.
GODING, DR. F. W.....Rutland, Ill.
GROTE, AUG. R.....Bremen, Germany.
HAMILTON, DR. JOHN.....Allegheny, Pa.
HARRINGTON, W. H.....Ottawa.
HART, CHARLES A.....Champaign, Ill.
HOLLAND, REV. W. J.....Pittsburgh, Pa.
HOWARD, L. O.....Washington, D. C.
HUDSON, G. H.....Plattsburgh, N. Y.
JACK, J. G.....Jamaica Plain, Mass.
KENYAN, F. C.....Lincoln, Neb.
KIRKLAND, A. H.....Amherst, Mass.
KUNZÉ, DR. R. E.....New York.
LEMBERT, J. B.....Yo Semite, Cal.
LYMAN, H. H.....Montreal.
MACGILLIVRAY, A. D.....Ithaca, N. Y.
MOFFAT, J. ALSTON.....London, Ont.
NEUMOEGEN, B.....New York.
PACKARD, DR. A. S.....Providence, R. I.
PATTON, W. HAMPTON.....Hartford, Conn.
RIVERS, J. J.....Berkeley, Cal.
SKINNER, DR. H.....Philadelphia.
SLINGERLAND, M. W.....Ithaca, N. Y.
SLOSSON, MRS.....New York.
SMITH, DR. J. B.....New Brunswick, N. J.
STRECKER, DR. H.....Reading, Pa.
TOWNSEND, C. H. TYLER.....Kingston, Jamaica, W. I.
VAN DUZEE, E. P.....Buffalo, N. Y.
VAN WINKLE, A. S.....Keota, Iowa.
WEBSTER, F. M.....Wooster, Ohio.
WICKHAM, H. F.....Iowa City, Iowa.
WILLISTON, PROF. S. W.....Lawrence, Kansas.
WOLCOTT, R. H.....Grand Rapids, Mich.

6770

The Canadian Entomologist.

VOL. XXV. LONDON, JANUARY, 1893. No. 1.

DESCRIPTIONS OF FOUR NEW WEST AFRICAN BUTTERFLIES.

BY W. J. HOLLAND, PH. D., PITTSBURGH, PA.

EURYPHENE, BOISD.

1. *E. castanea*, sp. nov.

♂. The form of the wings is exactly like that of *Senegalensis*, H.-S. UPPERSIDE.—The ground colour is rich chestnut-brown, marked by broad black series of spots and bands. Upon the primaries these markings are as follows :—In the cell a longitudinal basal streak, a transverse line, a figure 8, a twice curved transverse line, and a broad bar at the end of the cell constricted in the middle ; below the cell there is a short basal band curving inwardly ; beyond the cell there is a wide band running from the costa toward the outer margin as far as the lower radial, and then abruptly turning and extending to the middle of the inner margin ; beyond this is a broad band of diffuse spots, wide on the costa, narrower beyond the end of the cell, and gradually widening as it approaches the inner margin ; beyond this is a submarginal series of very black round spots. The outer margin is black. All of these lines are continued upon the secondaries parallel to the outer margin, and in addition there is a narrow, submarginal black line. In the cell of the secondaries there is a round spot at the base, a figure 8, and a constricted annular mark at the end. UNDERSIDE.—The prevalent colour on the underside of the wings is pale fuscous, shading into ashen grey upon the cells of both wings. The markings of the upper surface scarcely reappear upon the lower side, except the submarginal band of round spots, which reappear upon the primaries as faint blackish marks, and upon the secondaries as ocelli with pale ashen margins. In both wings there are in the cell a black basal dot, a figure 8, and a narrow constricted annular mark at the end. In addition, upon the primaries the costa near the base is white, and there are a couple of small white marks at the apex ; upon the secondaries there is a narrow white bar extending from near the middle of the costa to the first subcostal nervule.

Expanse 58 mm. Habitat Kangwé, Ogové Valley.

2. *E. suffumigata*, sp. nov.

♀. The form of the wings is like that of *E. eliensis*, Hew. Upperside.—Both wings are dark smoky-brown, shading into black at the apex of the primaries and clouded on the costa and cell of the primaries, with obscure black markings. There is a broad yellowish subapical band on the primaries, running from the costa and terminating before the outer margin above the third median nervule. Upon the secondaries there is a continuous slightly undulating dark brown submarginal line. Underside.—The ground colour is light green, or glaucous. The costa of the primaries at the base, the apex, the costal portion of the subapical band of the primaries which reappears upon the lower side, and a narrow bar running from before the middle of the secondaries from the costal to the first subcostal, are all white. The outer half of the wings is suffused with a fuliginous shade defined inwardly by a curved line running from the outer margin of the primaries below the apex to the origin of the third median, and thence to the middle of the inner margin, across the secondaries beyond the end of the cell, sweeping inwardly from the origin of the third median to a point above the anal angle on the inner margin. Faint traces of a submarginal band of ocelli appear upon the secondaries. Body and legs concolorous.

Expanse 75 mm. Habitat Talaguga, Ogové Valley.

This noble and well-marked species is represented in my collection by a single specimen taken in the spring of the present year. It is likely to be confounded with *E. Phantasia*, Hew., from which it may, however, be at once distinguished by the absence of the broad blue submarginal band running from above the first median nervule on the primaries to the anal angle of the secondaries in the female.

Aterica, Boisd.

3. *A. fuliginosa*, sp. nov.

♀. Antennæ black. Body above dark brown. Underside of palpi, thorax and abdomen light grey. Upperside.—The ground colour of the upper side of the wings is smoky-brown, shading into dark brown near the apex of the primaries. There is a series of four minute white spots extending from the costa before the apex to the third median nervule. A broad oblique subapical yellow band runs from the first subcostal nervule beyond the cell toward the outer margin, terminating upon the first median nervule. The inner margin of this band is moderately straight; the outer margin is irregular, being indented upon the lower radial and the second

median nervules. The usual markings appear obscurely in the cell. The posterior wings are ornamented by a submarginal band of obscure ocelli running parallel to the outer margin. These spots are lighter than the rest of the wing and ringed about with dark brown, and have in the centre dark brown subhastate pupils. UNDERSIDE.—The underside is obscurely brownish-grey. The markings of the upperside reappear, and on the underside of the secondaries the submarginal band of ocelli is indicated by a series of minute white spots located on the inner edge of each ocellus. There are seven of these minute white spots on each secondary. The base of the secondaries has a few obscure markings characteristic of the genus, the most prominent of which is an annular mark in the middle of the cell.

Expanse of wings 68 mm. Habitat Kangwé, Ogové Valley.

I hesitated to describe this species from the solitary ♀ specimen, but it is wholly unlike the female of any species known to me, and does not exist in any of the English collections which I have consulted, and was pronounced by Mons. Mabille, to whom I showed it, as undoubtedly a new species. It comes nearest to *A. aridatha*, of Hewitson, but it is totally distinct, being much larger and quite differently coloured, and the subapical band of the primaries having an altogether different form.

EUPHAEDRA, HUBN.

4. E. imitans, sp. nov.

♂. Very closely allied to *E. Eusemoides* recently described by Smith & Kirby, but readily distinguished from that species by the fact that the yellow spots on the middle of the primaries are not widely separated as in Eusemoides, and that the base of the primaries is adorned by a number of *blue spots*, and that along the inner margin of the primaries there is a *long yellow streak*. The secondaries have a *yellow spot on the base and three black spots in the cell*, and the broad black border is interrupted by a *marginal series of obscure geminate blue spots*. The underside has a spot at the base of the secondaries pupilled with yellow, in addition to the spots which appear upon the underside of *E. Eusemoides*.

♀. The female is like the male, but much larger, and the marginal blue spots upon the upperside of the secondaries are brighter and larger.

Expanse ♂, 58 mm.; ♀, 85 mm. Habitat Talaguga, Upper Valley of Ogové.

Represented in the collection of the author by two males and one female. It is a very close mimic of *Xanthospilopteryx longipennis*, and even more so of a species of this genus in the collection of the writer which has not yet been named.

Pittsburgh, Nov. 30, 1892.

SOME NEW ADDITIONS TO THE GENUS CLISIOCAMPA, CURT.

BY B. NEUMOEGEN, NEW YORK.

C. Mus, nov. spec.

♂. Head, palpi and thorax whitish gray. Antennae brown, with whitish stems. Abdomen gray, intermixed with black hair. Primaries dark gray, with veins indicated more or less by white. A broad blackish transverse band between two whitish lines, which are slightly toothed at intersections of veins. Basal space whitish, with black tings along costa. Fringes gray, with brown accentuations at terminus of subcostal and median veins. Secondaries dark chestnut-brown, fading into whitish tinges along anal margin and in basal space. A faint, whitish mesian line. Fringes gray and brown alternating.

Below. Primaries dark brown, dusted with gray in submarginal space and along costa. The outer transverse line well marked. Secondaries whitish gray. The mesian line well curved and prominent. Legs brownish-gray. In some specimens there is a shading from gray into light brown, and the white veins are less prominent on upper surface of primaries.

♀. Antennae, head and thorax whitish gray. In some specimens exceptionally blackish-brown. Abdomen whitish gray. Primaries dark gray. A broad, blackish transverse band enclosed in white transverse lines, slightly toothed at veins. The latter appear as white horizontal lines, in crossing this band. Basal space whitish. Fringes as in ♂. Secondaries of chestnut colour, fading in basal space, with black dashes, especially along costa. Fringes alternately brown and gray.

Below. Primaries and secondaries light chestnut-brown, slightly dusted with gray granules. Basal spaces of whitish tinge. The outer transverse line of primaries indicated in dark brown. Legs and abdomen yellowish-gray, dusted with black.

Types, ♂ ♂ and ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 24-25. mm.; ♀ 36-37. mm.

Length of body: ♂ 8. mm.; ♀ 10. mm.

Habitat: Southwest Utah (about 30 specimens) and Arizona, (Prescott, one specimen.) Easily recognizable by its gray primaries with dark band, traversed by white veins.

C. Mus. var. *discolorata.*

♂. Antennae, head and collar dark brown. Thorax and abdomen brownish-gray. Wings light brown. The two transverse lines of primaries dark brown, with an outer tinge of yellowish.

Below. Primaries light brown. The outer transverse line well marked

in darker brown. Secondaries of a somewhat lighter tinge, with yellowish dust. Brown mesian line. Legs and abdomen dark brown.

Type, 1 ♂ from S. W. Utah. Coll. B. Neumoegen.

Raised out of a lot of about 50 typical *C. Mus* by Mr. Chr. I. Weidt. It seems to be rare.

♀. Antennae dark brown. Thorax and abdomen brownish-gray. Wings chestnut, with somewhat lighter dusting along anterior margin, and in basal space. Well marked dark brown lines encircling transverse band of primaries. Secondaries with lighter basal shades.

Below. Wings light chestnut, with grayish granules along anterior margins and basal spaces. Outer transverse line of primaries, and mesian line of secondaries slightly indicated.

Types coll. B. Neumoegen.

Several specimens raised by Mr. Weidt in S. W. Utah, and one specimen from Prescott, Arizona, tallying with the foregoing, but being of somewhat lighter colour in its wings.

C. Azteca, nov. sp.

♂. Antennae brown. Head and thorax grayish-brown. Wings and body of a peculiar blackish-brown tint. Primaries: apex sharply pointed. A transverse band of still darker shade, the two border lines of the same especially dark, the outer line relieved by a yellow streak. Running parallel with the latter, from costa to inner margin, a subterminal undulating irregularly shaped band, giving the wing the appearance of having three transverse lines. The inner line, encircling basal space, well curved towards base; the anterior line somewhat outwardly curved in its course through median space. Secondaries uniform in colour. Fringes of both wings alternating with yellow.

Below. Legs and body grayish-brown. Wings of a lighter brown shade, powdered with yellowish grains along anterior margin of primaries and over the entire surface of secondaries. Primaries show the outer transverse line, and secondaries a well curved mesian line. Basal spaces the darkest in both wings.

♀. Blackish-brown, lighter in shade than ♂. Body concolorous. Antennae, head and thorax grayish-brown. Primaries with broad transverse band, the inner line well curved towards base and of grayish colour. The outer line grayish, somewhat bulging at centre and slightly dentated at veins. Secondaries uniform in colour, showing a faint trace of a mesian line. Fringes in both wings alternating with faint yellow.

Below. Wings uniform in colour, but of lighter tint than primaries, which show faintly the outer line of transverse band. Secondaries with a somewhat darker undulating mesian line.

Types: 2 ♂ ♂ and 2 ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 31. mm.; ♀ 36. mm.

Length of body: ♂ 6. mm.; ♀ 10. mm.

Habitat: City of Mexico and vicinity. Caught by Mr. Moonz.

This is the darkest coloured American Clisiocampa and easily recognizable.

DESCRIPTION OF A NEW TOLYPE.

BY B. NEUMOEGEN, NEW YORK.

P. tolteca, nov. sp.

♂. Antennae light brown. Eyes black. Head, prothorax and thorax snowy white. Tegulae snowy white, with black hairy centre band, connecting it with the black haired abdomen, just like in *T. velleda*, Stoll. Abdomen metallic black, clothed with long hair and long drawn out anal tuft. The latter intermixed with white hair. Primaries dark slate, especially in the interspace formed by a marginal and a double central transverse line, as well as along costa and internal margin. Veins white. A lunulate white discal spot, and whitish tinges around it. Three transverse, undulating, white lines, two of which are double, the discal space being enclosed by these double lines, and the marginal transverse line being single. The latter crosses from apex the subcostal veins in a straight line, parallel with anterior margin, but becomes undulating in traversing the median veins. A thin, dark line indicates anterior margin. Fringes light brown. Wings show irridescence in a slanting position. Secondaries dark slate, with gray fringes; anterior margin indicated by a thin black line.

Below. Palpi black below. Abdomen and legs snowy white, the latter pilose, having the tibiae dotted with black. Wings blackish slate, especially dark along costal and in basal spaces, with veins and undulating marginal lines of grayish white.

♀. Much larger and of lighter shade than ♂. Antennae, head, thorax and central thoracical streak the same as in ♂, but the hairy body snowy white, with gray segmentary tuft. The same transverse lines on primaries, the one near base and the central line, which enclose disc, being double, and only the marginal line being single. Basal area tufted with snowy white. Costa whitish. Fringes light brown. Veins white. Secondaries dark slate, with basal white tuft, a white undulating marginal line and grayish-brown fringes.

Below. Black palpi. White abdomen and legs, the tibiae with black dots. Anal portion of body covered with light brown hair. Wings slate colour with white nerves. Primaries showing the white double central and marginal, the secondaries only the marginal line. Basal areas and sections along marginal lines the darkest.

Types, 2 ♂ ♂, 2 ♀ ♀. Coll. B. Neumoegen.

Expanse of wings: ♂ 30. mm.; ♀ 45. mm.

Length of body: ♂ 10. mm.; ♀ 21. mm.

Habitat: City of Mexico and vicinity. Collected by Mr. Moonz.

This insect greatly resembles *T. velleda*, Stoll., but its transverse lines on primaries differ and it is easily distinguished by its smaller size and darker colour, especially on the secondaries.

CAN THE DIPTERA BE CONSIDERED THE HIGHEST INSECTS?

BY C. H. TYLER TOWNSEND.

In the Nov., 1892, number of the CANADIAN ENTOMOLOGIST, pp. 269-70, there is printed a paper which was read by Professor H. Osborn before the Entomological Club of the A. A. A. S. at its Rochester meeting in August, 1892. It is entitled: "Honey-bee or House-fly." In this article Professor Osborn questions the view, first advanced by Hyatt and Arms, that the Diptera are to be considered the highest insects. At the end of the paper appear the following remarks, which were made at the time the paper was read before the meeting:—

"Mr. Smith thought that the line of argument adopted by Messrs. Aldrich and Townsend was inconclusive, and that the article referred to carried with it its own refutation. He thought Mr. Osborn was correct in that the orders should be placed parallel, but that groups or families were more highly developed in some orders than in others. Mere specialization is never a test of rank in itself, and any line of argument that places the Hippoboscidæ at the head of the insects as the highest in rank is simply unworthy of attention, since it omits the intellectual or nervous development as a factor."

The over-confident and assuring manner in which the above paragraph disposes of the subject is rather ludicrous. One might fancy the question finally answered, and consigned to oblivion. I feel safe in saying that such a hasty and incompetent dismissal of the subject will command little attention from anyone who is well informed in insect embryology.

Professor Osborn's paper simply makes the point that there are objections to attempting an expression of lineal rank or descent in groups of animals, but that the orders of insects are divergent, or more or less parallel developments from a common form.

The writer, in his note on the subject in *Science* (June, 1892), did not attempt to express the idea that the orders of insects led up in a natural or any other series to the Diptera; nor is any such view held by Hyatt and Arms, or Professor Aldrich, in what they have written on the subject. I desire to say also that I have not in any way upheld the view that the Hippoboscidæ should be considered the culminating point, but have rather pointed to the cyclorrhaphous families as occupying that position.

It is very conclusively shown by Hyatt and Arms, Insecta, pp. 273-4,

287-8, that the Diptera are by far the most specialized insects, and that they should therefore be considered the highest in rank. If any one still doubts that they are the most specialized, he may be referred to the late edition of Lowne's Anatomy etc., of the Blow Fly, part I., Oct., 1890. The wonderful development of the muscid pupa from the imaginal discs, all the larval organs undergoing disintegration, is not paralleled in any other order of insects. I contend that specialization, as deduced from the ontogeny of the insect, is the best and only reliable criterion of rank. Let those who believe otherwise point out a better one. To talk of an intellectual development in insects is absurd. I do not admit that the actions of the social hymenoptera are in any way actuated by reason or intellect. It is, rather, inherited habit.

As to the ubiquitousness of the House-fly, this is rather a point in its favour. It has, entirely on its own resources, become emphatically cosmopolitan, and even man "in all his glory" is unable to reduce its numbers, or in any way to cope with it. On the other hand, the Honey-bee has for ages been cultivated, cared for and protected by mankind. Yet I would not by any means suggest the House-fly as the climax of insect development.

Man is the highest animal, because of his immense cerebral specialization. There is no such contrast in cerebral development between the lowest and highest insects as there is even between the anthropoid apes and man. Consequently I believe that the same factor should not be used as a criterion of rank in insects. At the same time, man is farthest removed from the ancestral mammalian form in his general structural development, as deduced from his ontogeny, and this can and should be used as the basis of argument, not only in insects, but in all other groups of animals.

This line of reasoning puts the Diptera at the head of the insect body, inasmuch as their larval stages show greater specialization or development than the larvæ of any other order of insects, while their perfect form points them out still more emphatically as the farthest removed from the ancestral thysanuriform type.

If there is an objection on the part of some to the term "highest", let the expression "most specialized" be substituted therefor. I cannot help believing that the use of the latter would be preferable.

A NEW ARRANGEMENT OF THE COLEOPTERA.

BY WM. HAMPTON PATTON, HARTFORD, CONN.

Coleoptera may be described as Mandibulate Insects, with the fore-wings horny and the two basal abdominal joints invisible on the venter.

A reduction in the number of abdominal joints at the tip and in the number of joints in the tarsi indicates advancement in rank among Coleoptera. Likewise, a specialization of the antennae to clavicorn or lamellicorn indicates advancement, as well as does the degradation of the larva. The Lampyridæ are the lowest in rank, shown by their lax structure. The Heteromera and Phytophaga show high development in the specialization of their tarsi. The Rhynchophora are especially aberrant, and there is evidence of advanced type shown in the low development of the apodous larvae, greatly specialized prosterna and concealed ventral segments. A few Heteromera, the Buprestinae and the Lamiinae resemble them in their larvae. The larvae of Bruchidae are similar to those of *Brenthus* and *Anthribus* in their minute legs. The Weevils may be placed ahead of the other Coleoptera, although the Chafers are nearly as high.

The Cicindelidae present a character not elsewhere found in the Dolichogastres, *i. e.*, a dilation of the metapleura. A similar, but more extended, dilation is characteristic of the Rhynchophora and Phytophaga.

The arrangement below is verified in the preceding paragraphs.

SYNOPSIS OF COLEOPTERA, TWO SERIES.

DOLICHOGASTRES.—Six or more ventrals visible (exc. Elateridae and Buprestidae).

= Metapleura not widened (exc. Cicindelidae). Pentamerous (Normopleura).

First visible ventral entire. Series *Serricornia* (Malacodermes, Sternoxi). Series *Monilicornia* (Brachyelytra).

First visible ventral divided by the coxæ. Series *Filicornia* (Adephaga).

BRACHYGASTRES.—Only five ventrals usually visible.

= Metapleura not widened. Six ventrals in many families (Normopleura).

Heteromerous. Series *Heteromera*. First visible ventral not divided by coxae. Antennae various.

Pentamerous.

Series *Clavicornia* (Philhydrida, Necrophaga).

Series *Pectinicornia*. Series *Lamellicornia*.

= Metapleura widened (Tetramera). Never more than five ventrals. (Platypleura).

Series *Phytophaga.*

Series *Rhynchophora.*

The conclusion which may be drawn from this synopsis is that the Tetramera are the equivalent of all other beetles taken together. Those who follow LeConte's views would place the Rhynchophora apart from all others; then the division would be into Tetramera and Pentamera, the last including the Heteromera and Trimera.

A GENERAL SUMMARY OF THE KNOWN LARVAL FOOD-HABITS OF THE ACALYPTRATE MUSCIDÆ.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In a short paper published in the Trans. Kans. Acad. Sci., Vol. XIII., on the occurrence, in a single restricted locality in Arizona, of a species of *Micropeza*, I gave a very brief resumé of the food-habits of some of the better known families of Acalyptrate Muscidæ, with the view of suggesting the possible habit of the species there considered. This prompted me later to bring together all available notes on the subject. As these small flies are of much economic importance, both as being injurious and beneficial, I have felt that a quite complete summary of their larval food-habits would be of much use to the working entomologist, besides being of no little importance to those who may be making a special study of the diptera. I should acknowledge drawing a considerable number of the notes from Schiner, Westwood and other European authors. All such refer to European species, but often apply equally as well to American species, when such exist in the genera named. All are of importance as indicating the great range and variety of the food-habits in this section of the Muscidæ The only families of whose larval habits nothing seems to be known are the *Micropezidæ, Phycodromidæ, Opomyzidæ, Leiopsidæ, Asteidæ* and *Geomyzidæ.*

According to their habits, the larvæ of the Acalyptratæ may be grouped in three categories: Scavengers, phytophagic species, and entomophagic or parasitic species. These groups may be separated into sub-groups, as will be seen from the accompanying synoptic view:

Synopsis of larval habits of the Acalyptrate Muscidæ.

- **Scavengers.**
  - Coprophagous species or dung-feeders.
  - Feeders on decaying vegetable matter.
    - In decaying fruits.
    - In decaying wood and under bark of trees
    - In decaying plants and leaves.
    - In decaying roots and tubers.
    - In fungi.
  - Feeding in fluids.
    - Salt or alkaline water and mud.
    - Urine.
    - Vinegar.
    - Sap from wounds of trees.
  - Feeders on animal matter.
    - Cheese.
    - Animal fats.
- **Phytophagic species.**
  - Gall makers.
  - Fruitfeeders
    - Infesting soft fruits.
    - Living in pods, seeds and berries.
    - Living in flower heads.
  - Leaf miners.
    - In water plants.
    - In foliage of trees and land plants.
  - Feeders in stems of plants and holms of grasses.
  - Root feeders.
  - Feeding in seaweed.
- **Entomophagic species, or group with a parasitic tendency.**
  - Parasites?
    - In scales.
    - In plant lice.
  - Pseudo parasites?
    - On scale insects.
    - On plant lice.
    - On larvæ.
  - Inquilines in bees' nests.

Summary of larval habits.

Fam. CORDYLURIDÆ:

Norellia spinimana; larva found on an anthomyiid larva (Bremi).

Cleigastra apicalis; larva in noctuid caterpillar (Boié). *Cl. suisterci;* bred from larvæ in swine dung (Townsend, CAN. ENT.)

Scatophaga; larvæ in dung and human excrement, also in water (Sch.).

Fam. THYREOPHORIDÆ:

Thyreophora; larvæ found in anatomical preparations (Rob. Desv.)

Fam. HELOMYZIDÆ:

Helomyza; larvæ in fungi and truffles (Westw.)

Leria serrata; larvæ in dung (Bremi), in fungi (L. Dufour).

Thelida; a species on bat dung (Rob. Desv.)

Fam. HETERONEURIDÆ:

Clusia; pupæ in mouldered tree trunks (Staeger).

Heteroneura; larvæ and pupæ under bark of trees and in decaying tree trunks. *H. albimana;* bred by Schiner from pupæ found in trunk of a weather-beaten willow.

Fam. SCIOMYZIDÆ:

Dryomyza; larvæ in fungi (Meq.)

Actora; breeds in seaweed (Boh.)

Tetanocera ferruginea; larvæ live between the leaves of Lemna and Callitriche in water (L. Dufour).

Fam. DORYCERIDÆ:

Dorycera; larvæ live amongst leaves of water plants, several species being subcutaneous (Westw.) *D. graminum;* larvæ in water (Geoffr.)

Fam. PLATYSTOMIDÆ:

Platystoma umbrarum: larvæ live in decayed wood underground (Perris).

Fam. ORTALIDÆ:

Herina (Ortalis) frondescentiæ; larvæ feed on pulp of cherry (Réaumur).

Tritoxa (Ortalis) flexa; larvæ live in onions.

Psairoptera; larvæ of a species found under bark of Pinus, and Populus tremula (Sch.)

Chloria (Ulidia) demandata; larvæ in old horse dung, where they passed the fall and winter (Bouché).

Chaetopsis aenea; bred from larvæ found July 5 burrowing in the centre of a stalk of corn (Gillette).

Fam. LONCHÆIDÆ:

Lonchæa nigra; larvæ in the stems of Verbascum, Angelica and Carduus. *L. parvicornis;* larvæ in suckers of Triticum repens, on which they cause galls with a scale-like covering, the dead leaf-sheath (Perris). *L. lasiophthalma;* larvæ under similar circumstances on suckers of Cynodon sp. Larvæ of other species under bark of trees (Giraud).

Fam. Sapromyzidæ:

Sapromyza; larvæ under decayed leaves (Bouché), in rotten straw (Perris), and in fungi (L. Dufour).

Fam. Trypetidæ:

Platyparea; larvæ of a species in asparagus (Sch.)

Euphranta; larvæ of a species in pods of Vincetoxicum officinale, pupating in the earth (Giraud).

Aciura femoralis; bred from larvæ found in Phlomis fruticosa (v. Frauenfeld).

Acidia; larvæ of a species in leaves, which they mine (Sch.) Larvæ of another species in fruit of Lonicera xylosteum (Lev.) *A. artemisiæ;* larvæ mine leaves of Chrysanthemum (Westw.)

Spilographa; larvæ in fruits or berries, while some mine leaves (Sch.) *S. alternata;* larvæ in berry of Rosa villosa (Bouché, quot. by Westw.)

Orellia wiedemanni; larvæ live in leaves of Bryonia (Sch.)

Trypeta; larvæ of many species live in flower heads of various compositæ.

Rhagoletis (Trypeta) pomonella; larvæ in apples (Wlsh.)

Acrotoxa (Trypeta) ludens; larvæ in oranges (Riley).

Eurosta (Trypeta) solidaginis; larvæ in galls on stems of solidago (Fitch).

Urophora; larvæ of many species live in various parts of composite plants (Sch.) *U. cardui;* larvæ in large galls on thistle (Westw.)

Myopites; larvæ in flower-heads of Mula sp. (v. Frauenf., v. Roser).

Ensina sonchi; larvæ live in flower-heads of Sonchus, Apargia, Senecis, Tragopogon, Podospemum (Sch.), Carduus (v. Frauenf.)

Carphotricha; larvæ live in Compositæ, preferably Liguliflorae (Sch.)

Euleia onopordinis; larvæ mine in leaves of celery (Westw.)

Oxyphora; larvæ in flower-heads of various Compositæ (Sch.)

Tephritis; larvæ in flower-heads of Compositæ (Sch.)

Anomoia; larvæ of a species in berries of Crataegus oxyacantha (Sch.)

Ceratitis capitata; larvæ in peaches, oranges and other citrus fruits (Westw.)

Dacus oleæ; larvæ in olives, two or three larvæ in a fruit, pupating in the earth.

Eutreta diana ; larvæ in gall on wild sage, Artemisia tridentata, in Mo. (Riley, Osten Sacken).

Straussia (Trypeta) longipennis ; the fly oviposits in stalk of Helianthus (sunflower) near tip, in June and July (Lintner, 3d. Rep.)

Fam. Sepsidæ :

Nemopoda cylindrica ; larvæ in human excrement (Bouché, West., Sch.)

Themira putris ; larvæ in slimy water and mud (Sch.)

Fam. Piophilidæ :

Piophila ; larvæ in cheese, ham-fat and fatty animal matter in general (Swamm.). In salt (Germer).

Fam. Psilidæ :

Chyliza leptogaster ; bred from irregular galls the size of a walnut on the stems of Spiræa opulifolia—not known that the galls were caused by these flies (Scholtz).

Psila rosæ ; larvæ in roots of Daucus (carrot) and Brassica (Sch.)

Fam. Oscinidæ :

Platycephala ; pupæ of one species in reed stems (Boié)

Meromyza americana ; larvæ in stems of wheat, rye and probably in grasses (Riley, Webster and others).

Chlorops ; larvæ of several species live in holms of grasses and cereals. *Chl. pumilionis*, *Chl. glabra ;* larvæ injuring wheat (Bjerkander, Westw.)

Chloropisca prolifica ; supposed by Dr. Lintner to breed in grass of lawns (7th Rep. N. Y. Ent., p. 239).

Lipara ; larvæ in reed stems, causing large galls near the tops, in which they pupate (Sch.)

Oscinis ; larvæ live in holms of grasses and cereals. *O. frit ;* larvæ in husks of barley in Sweden (Linn.) Species in wheat in U. S. (Garman, Webster).

Siphonella ; larvæ in grasses, also in other plants (Sch.) Two species in flower-heads of various Cynerocephalæ (Egger, v. Frauenf. Larvæ of one species in worm-eaten nuts, in company with curculionid larvæ (Perris, v. Frauenf)

Elachiptera ; pupæ on a species in large quantities under the bark of old poplars (Sch.)

Gampsocera; larvæ in decayed stems of Althea (H. Heeger).

? Novum genus ; bred in California from a spider's egg-mass.

Fam. Ephydridæ :

Halmopota ; larvæ in salt-pits (Bouché).

Ephydra ; larvæ in salt-pits (v. Heyden), in salt-pits of Kissingen (Diruf). *E. californica ;* larvæ live in great numbers in water of alkaline lakes in the south-western U. S. (Packard, Williston). *E. hians ;* larvæ in immense numbers in water of Lake Tezcuco, in Mexico, and are used by the Mexican Indians as food. It may also be mentioned that the larvæ of E. californica are used by the Pah-Utes as food (Williston).

Teichomyza fusca ; larvæ live in urine (Rob. Desv.)

Fam. Drosophilidæ :

Aulacigaster ; larvæ of only species found in wounds on elm trees (L. Dufour).

Gitona ; larvæ of only species live in flower-heads of Sonchus arvensis (Loew), probably also in flower-heads of Onopordon (Sch.)

Drosophila ; larvæ usually in sour-fermented matter, fermented liquids, vinegar, decayed fungi, ulcerated wounds of trees, decayed fruits (Sch.) *D. ampelophila ;* larvae in pomace of cider mills, in pickled and preserved fruits (Lintner), bred from maggots found hollowing out grapes (Forbes). *D. quinaria ;* bred from a mass of cochineal insects (Riley & Howard). Some species (Scaptomyza Hardy) are leaf-miners (Sch.) One or more species mine turnip leaves in Europe and U. S. (Curtis, Garman).

? Stegana ; breeding in hen dung (Riley & Howard, Ins. Life, II., 254). It is perhaps doubtful whether this fly belonged to the Drosophilidae.

Fam. Ochthiphilidæ :

Leucopis ; larvae parasitic (?) on plant lice and scale insects, (?) in spiders' nests (Sch.) *L. bellula ;* reared from cochineal insect (Riley & Howard). *Leucopis* sp.; parasitic (?) on Rhizococcus sp. on grasses in Nova Scotia (Fletcher).

Lestophonus iceryae ; parasitic (?) on Icerya (Riley).

Fam. MILICHIDÆ :

Cacoxenus indagator ; larvae live in nests of Osmia emarginata, consuming the food prepared for the Osmia larvae and causing them to die (Giraud). Probably found in other bees' nests (Sch.)

Fam. AGROMYZIDÆ :

Agromyza ; larvae are leaf-miners or live in pith of plants (Sch.) *A. tritici ;* bred from larvae crawling in large numbers from unthreshed wheat in a barn (Fitch).

Ceratomyza ; larvae of one species mine leaves of Sonchus oleraceus (Sch.)

Fam. PHYTOMYZIDÆ :

Phytomyza ; larvae are leaf-miners (Sch.), some species pupating in the parenchyma of the leaf (Chromatomyia Hardy). *P. chrysanthemi ;* larvæ mine leaves of Chrysanthemum, Tanacetum, Eupatorium, Gazania, Helianthus, Cineraria (Lintner). *P. lateralis ;* larvae live in heads of Anthemis, Pyrethrum, and in stems of Centaurea, Verbena and Urtica (Kaltenbach), mining in Sonchus (Gourean). *P. flava ;* larvae in subcutaneous mines in leaves of Scolopendrium vulgare, a fern (Doubleday). *P. flaviceps ;* larvae mine leaves of woodbine (Hal.) *P. obscurella ;* larvae mine leaves of holly (Hal.), in honey suckle (Glover). *P. nigricornis ;* larvae mine in underside of leaves of turnip, peas, forming long galleries in parenchyma beneath lower cuticle, pupating at end of gallery (Curtis), also mine leaves of monkshood, Aconitum (Kaltenbach).

Fam. BORBORIDÆ :

Borborus ; larvae in dung and decayed fungi (Haliday).

Sphaerocera ; larvae live in horse dung (Sch.)

Limosina ; larvae of a species in Confervae, in diseased potatoes, and in fungi (Sch.)

NOTE.—If any genera whose larval habits are known have been omitted, or if any peculiarity in habit of a genus here mentioned is not included, the author will be glad to know of the references or observations. The list is not supposed to be complete.

LARVÆ OF PAPILIO PHILENOR BECOMING LARVOPHAGOUS.

BY RICHARD E. KUNZE, M. D., NEW YORK.

"I perish by my art; dig mine own grave;
I spin the thread of life; my death I weave."

Truly wonderful is the adaptability of some individuals when placed under circumstances tending to diminish the reproduction of their race. Desirous of raising larvæ of *Papilio philenor*, I planted two years ago five vines of Dutchman's Pipe *(Aristolochia sipho)* in my back yard, which in the summer of the present year (1892) covered a wall and fence 16x7 feet with luxuriant foliage.

July 2nd a friend brought me, from Staten Island, N. Y., from 125 to 150 larvæ of *Philenor*. The majority had passed their first, and a few their second moult. All were transferred to the leaves of the Dutchman's Pipe vine in my garden plot. By the ninth of July nearly all the leaves of my Pipe vines were devoured, before less than half of the leaves were full grown. I then removed fifty of the largest to a five-gallon flower pot, covering the bottom with a layer of loam, and filling up this breeding cage with as many leaves of *Aristolochia sipho* as it would hold. The pot and loam were first well sprinkled with water to furnish moisture for stems of *Aristolochia* vines, and the top covered with thick manilla paper to prevent evaporation, inasmuch as the porosity of the cage answered every such purpose. Two days later the leaves of breeding cage were all devoured, and those on my vines in the garden nearly so. I divided what remained of the latter, and gave an equal share to larvæ in the cage. Exactly forty-eight hours afterward the Pipe vines of the garden were entirely defoliated, and the larvæ contained in the flower pot nearly all transforming into chrysalids.

Two days previously I requested my friend, Mr. Ehrenberg, who furnished the larvæ, to procure me a supply of *Aristolochia* leaves from Staten Island, where he officiated as landscape architect at a well-known villa, else most of our larvæ would perish. In the meantime the owner of the villa noticed the foliage of his *Aristolochia* trellis disappearing rapidly, caused by the remaining larvæ which my friend had failed to take off for me. His,(the owner's) instructions to the resident gardener to keep these larvæ well picked off had not been observed, he thought, while the landscape architect tried to raise a few more chrysalids on the trellis facing the

villa, and suggested to the gardener to defer operations a few days longer. The owner, not knowing of our intentions, became vexed and gave an Italian labourer a bagfull of sulphur, with orders to dust the *Aristolochia* with it effectually. How well the instruction was carried out may be inferred when it is known that those plagued worms, all the remaining foliage and much of the grass beneath the vines, were totally destroyed!

At the same time, while in expectation of an abundant supply of larval food, I had collected from the bare vines, wall and fences of the yard, from the passage ways of the house, and wherever they wandered in search of food, some sixty hungry larvæ. These were put into a lady's large bonnet box, and some fifteen different food plants which grew on the premises were placed therein to serve that wriggling mass of large black larvæ with long concolorous tubercles their immediate wants. But touch it they would not. On the evening of the ninth of July my friend returned from Staten Island without any food plant, and informed me of our misfortune. I knew of only two more private places in this city, and another in Astoria, Long Island, where *Aristolochia sipho* is cultivated. Not being acquainted with the owners, I could not obtain a supply.

The children of neighbours brought me numbers of my *Philenor* larvæ which had crawled into their yards and gardens. I decided to keep only the largest of these famishing larvæ, thinking to obtain a few more chrysalids while waiting for a possible supply of food plant, which, however, did not come. All others I gave liberty to go where they pleased. Many returned to the bare stem of my *Aristolochia*, where they nibbled at the epidermis of the vines until most had perished.

Necessity compelled the larvæ I had in that bonnet box to become *Entomophagous*, so to speak. Not a leaf of a plant, shrub or tree, wild or cultivated, would they eat. On the 11th of July I observed several of the caged larvæ had spun a thread of silk across their bodies and were suspended by their anal hooks from the sides of the cage. A number of other hungry larvæ were attacking and devouring their own kind which were helplessly "hung up" and could not escape from the onslaught of these carnivorous larvæ. On the next day I discovered a few chrysalids suspended from the box, which during transformation had escaped attack, while others were being devoured. But before they hardened sufficiently to permit of removal these chrysalids, too, were attacked and converted into food! It was a disgusting and repellant sight to witness. From day

to day this larval cannibalism continued to enable a number of individuals to transform into the second stage. When the chrysalis was not at once removed it would soon disappear, excepting only the outer case. Sometimes 3 or 4 larvæ would attack a suspended larva at the same time, and whenever a dismembered portion of the victim fell to the bottom of the cage other larvæ would seize and devour it. A dozen larvæ and as many chrysalids were eaten up in four days, and not even the skin of a larva would remain. Thermometer ranged from 80° to 92° in the shade, but no sign of decomposition was noticeable in cage. It was dog eat dog, and not even bones left to tell the tale!

July the 16th only nine larvæ were left, and two chrysalids transformed the previous day were in an unsightly condition—literally disemboweled. All of these larvæ were very lively, but whenever ready to transform would never be more than two-thirds the size of those naturally fed. One more unfortunate hung by its anal feet to become the next victim in order. July the 19th three larvæ were alive, of which one was "spinning the thread of life". I again placed 8 or 10 kinds of food plants in the cage, which in twenty-four hours were untouched. One chrysalid was left intact. I now placed the remaining two larvæ on my *Aristolochia* vines, inasmuch as a new growth of leaves was in sight. These immediately fed upon the tender food offered. A number of others, barely alive, were nibbling away at the bare vines lower down on the plants, and had not yet discovered the new foliage.

Altogether these were a most carnivorous lot of larvæ, from which I obtained only five chrysalids out of a possible twenty-five larvæ retained in that cage. From one of these emerged, in September, a ♂ imago of the normal colour, but smaller in size.

I am not aware that larvophagous caterpillars have been reported as occurring among Rhopalocera. In the *American Naturalist*, Vol. XX., page 556, it is stated that a Lycænid larva of *Feniseca tarquinius* feeds upon an Aphid which is found only on the branches of alder *(Alnus serrulata)* affecting swampy localities. One of my liberated *Philenor* larvæ fed upon a cultivated plant of *Azalea indica*, which was a potted plant fifteen inches in height. I discovered the chrysalid in September, and this was the only exception as far as I could discover where these had not fed either upon *Aristolochia sipho* or their own kind.

SYNOPSIS OF THE ASILID GENUS ANISOPOGON.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table includes those species of *Anisopogon* at present known to occur in this country north of Mexico :—

1.—Scutellum (except sometimes its extreme base) black.....2
Scutellum and face yellow, abdomen yellow, marked with five black fasciæ, wings pale yellow..... .....*vespoides*, Bigot

2.—Abdominal segments one to four wholly black.....3
Abdominal segments three to six (except sometimes their lateral margins) reddish..... 5

3.—Wings pure hyaline, the cross veins and furcations alone sometimes clouded with brown ; tibiæ reddish..... 4
Wings more or less brown, the apex never blackish....*ludius*, n. sp.
Wings having the apical half blackish..... { *phœnicurus*, Loew. / *gibbus*, Loew.

4.—Pollen of abdomen extending on the bases of the segments .....
.....*senilis*, Bigot.
Pollen confined to the apices of the segments.....*lautus*, Loew.

5.—Wings nearly uniform, smoky-gray ; head, first two joints of antennæ, thorax and legs obscure brown.....*rubidus*, n. sp.
Wings smoky-brown, darkest on apical half; head, antennæ and thorax black.....*patruelis*, n. sp.

Anisopogon ludius, n. sp. ♂.—Black, the tibiæ and tarsi dark reddish-brown. Face gently convex, white pilose, bristles of lower part black ; first joint of antennæ slightly longer than the second, the third joint tapering to the tip, three times as long as the second, the style slender, seven-eights as long as the third antennal joint ; pile of occiput, thorax, pleura, coxæ and venter white ; upper side of each front tarsal joint with a dense covering of appressed white hairs ; upper side of middle femora toward its apex with a dense covering of short appressed black hairs, which, however, leave a large elliptical naked space between the apex and the middle ; middle tibiae white pilose in front, and above the middle ornamented with a large patch of appressed black hairs and bristles, which form an inner and an outer fringe; inner side of hind tibiae near the tip, and also of the hind metatarsi, densely bright yellow pubescent ; wings smoky brown, lightest at the apex and along the hind margin ; all posterior and the anal cell open.

♀ as in the male, except that the front tarsi, middle femora and

tibiae are not ornamented as in the male, and the wings are much lighter, the brown forming a border to some of the veins. Length, 12-16 mm. Los Angeles and San Bernardino Counties, California, and British Columbia. Two males and three females, in May. The British Columbia specimen was received from Mr. W. A. Danby.

This species is closely related to *A. senilis* Bigot, but in the latter species the wings are wholly hyaline. and the appressed white hairs on the front tarsi of the male are confined to the first joint. I have specimens of the latter species from Colorado and Florida (Morrison). In both species, the colour of the bristles on the head, body and legs is too variable to be of any value in separating the species.

Anisopogon rubidus, n. sp. ♀.—Obscure brown, the following parts black :—The third antennal joint, basal half of style, proboscis, palpi, scutellum except its base, first segment of abdomen, basal half of second, lateral margins of the others, seventh segment and genitalia largely, apex of venter and upper side of each femur, that on the first and second segments of abdomen with a strong bluish tinge, brown of abdomen more reddish than on the other parts ; thorax irregularly marked with grayish black. Head gray pollinose, the pile yellowish-white ; face evenly convex, the pile extending nearly to base of antennae ; first joint of antennae slightly longer than the second ; third joint slightly longer than the first two taken together, tapering gradually to the apex, the style two-thirds as long as the third joint. Thorax gray and golden pollinose, the pile short, sparse, mixed black and white ; pleura gray pollinose, its pile and that of the coxae white, the fan-like pile in front of halteres also white. Pile of abdomen sparse, microscopic, light-coloured, that on lateral margins and on venter longer, whitish. Pile of legs sparse, whitish, that on tarsi and tips of tibiae largely black. Wings smoky gray, all posterior cells and the anal cell open.

♂ same as the ♀, except that the middle femora have each a cluster of black pile at its apex in front and two similar fringe-like clusters, one on the upper, the other on the lower surface at its last third, and above the middle of each middle tibia are two long dense fringes of black pile on its inner and outer sides, connected with each other in front ; front metatarsi destitute of appressed white pile. Length, 14 to 17 mm. Los Angeles County, Cal. Four females and one male.

Anisopogon patruelis, n. sp. ♂ ♀.—Same as the above description of *rubidus*, with these exceptions :—Head, antennae, thorax, scutellum and

femora, except the apex, black ; apical third of the first abdominal segment and the apical three-fourths of the second segment reddish in the female, but black in the male. Style one and a-fourth times as long as the third antennal joint. Wings smoky brown, lighter on the base as far as the furcation of the second and third veins ; a lighter transverse shade passes through the middle of the discal cell. Front metatarsi of the male densely covered with appressed white hairs above. Length, 13 to 16 mm. Texas. A single male and female received from the late H. K. Morrison.

THE LARVA AND CHRYSALIS OF CHRYSOPHANUS DIONE.

Some time ago Mr. Henry G. Willard, of Grinnell, Iowa, very kindly sent me some of the full grown larvæ of this species. I made a few notes at the time which may be of use, owing to the fact that nothing has been published in regard to the early stages of this butterfly. The food plant at the home of the insect is *Rumex longifolius*, but they readily ate our common species of dock found here. The full grown larva were onisciform in shape, grass green in colour, and 20 mm. in length. Most of them had a narrow, claret-coloured dorsal stripe, and the entire body, under a glass, was seen to be clothed with minute black hairs. The larva is of the same general appearance as that of *Chrysophanus hypophleas*, but larger. The chrysalis is the same shape as most others in the Lycænidæ, and looks very much like Scudder's figure of the chrysalis of *E. thoe*. In colour the chrysalis is a light hay colour, and the dorsal abdominal segments are heavily marked with blackish blotches. The dorsal thoracic segments are peppered with black spots. The wing covers are lightest in colour of any part, but are also peppered with the fine black points. The head, eyes and shoulder-joints are covered with black blotches. One chrysalis, which I think was entirely green and without the black markings, disclosed a *C. thoe*, but I did not notice any difference in the larva I had, so I conclude the larvæ of the two species look very much alike. Mr. Willard could perhaps give us something interesting about the times of appearance and habits of this butterfly, as it is common in his locality.

Henry Skinner, M.D., Philadelphia.

NOTES ON ZARÆA AMERICANA.—CRESS.

BY REV. THOMAS W. FYLES, SOUTH QUEBEC.

The young larva of *Zaræa Americana* appears in the beginning of July on *Menyanthes trifoliata*. It lies curled on the underside of the leaf. Its head is black, and its body lead-colour above and greenish-white beneath. It develops into the most beautiful larva of any of the Tenthredinidae that I am acquainted with.

Description of the full-grown larva.—Length one and a-quarter inches. Head black. Body above lead colour—excepting the anal segment, which is greenish white. The underside and the legs are greenish-white. The forelegs are tipped with black. Along the back are eleven pairs of raised and conspicuous bright yellow spots. Between the pairs, and on either side of them, are conspicuous jet-black spots, which, taken with the yellow ones, form rows across the back. There are other rows of *smaller* black and *pale-yellow* spots—two after each row of the larger ones. The side lines are white. Above these lines, on the margin of the lead-colour, is a row of black dots. Beneath them, just above the legs, is a series of raised yellow spots—each spot being surmounted by one or two black dots.

The larvae were plentiful in one spot, but could hardly be said to be *gregarious*, as only one or two were to be found on a plant. Towards the end of July the larva spins around itself a closely woven, dark-brown cocoon. In the spinning it usually gathers several leaves of the plant about it. The larva remains unchanged in the cocoon till spring, when it assumes the pupal state. The fly makes its appearance in the middle of May.

Description of the perfect insect.—In length the fly measures about nine-twentieths of an inch; and in expanse of wings about eighteen-twentieths. The antennae are dark brown, six-jointed and clavated. The wings are faintly clouded with brown. The head and thorax are dark brown and hairy. The abdomen, which is oval in outline, is of a rich velvety-brown above, with a slightly bronzy-green lustre. The colour fades into light reddish-brown on the sides and on the two last segments. The underside of the abdomen is pale brown. The tibiae and tarsi are white, and have a waxen appearance. The fly seems to be somewhat sluggish in its habits.

I am indebted to Mr. E. T. Cresson for the identification of the insect.

A NEW FORM OF PRIONIA, AND NOTES ON PLATYPTERYX ARCUATA AND P. GENICULA.

BY GEORGE H. HUDSON, STATE NORMAL SCHOOL, PLATTSBURGH, N. Y.

Prionia levis, n. var. or sp.

Primaries without the delicate frosted or silvery appearance, and without the numerous short, fine, strigate, brown lines of *bilineata*. The brown scales are present, but are uniformly and evenly distributed, save where they form the two brown lines which cross the wing, and a little darker shading near the outer edge and apex. These two transverse lines are about a third wider apart than in *bilineata*, the second narrowly edged externally with the clear, pale yellow ground-colour of the wing. There is no brown submarginal line, but a wavy, pale yellow line runs from inner margin to costa, midway between the second line and the outer margin. The vestiture appears to be more dense and smooth than in the allied form. Both primaries and secondaries seem to have a more decided ochreous tint.

Underside with markings more obscured.

Described from one male taken Aug. 13, 1887, and one female taken Aug. 3, 1890; both from the electric lights.

This may prove to be a seasonal form of *bilineata*. My dates of capture for the latter, since 1886, are as follows (the figure after the hyphen giving the number of specimens). May 8, 10-2, 15-3, 19; June 16, 22-2, 30.

Mr. H. G. Dyar, while here last summer, suggested that this new form might be the one which the late Mr. Hy. Edwards (Can. Ent, XIX, 146) referred to *P. lacertinaria*, Linn. (=*lacertula*, Den. and Scheiff.). Both *P. bilineata* and *P. levis* are distinct from the European form, although very closely allied to it. Mr. Dyar also called my attention to the fact that this form seems to vary somewhat after the manner of *Platypteryx genicula* from *P. arcuata*, as pointed out by Dr. Packard in "Proceedings of the Boston Soc. Nat. Hist.", Vol. XXIV., page 491, 1890. We separated the two forms and then looked up the dates of capture, with results as follows:—

Platypteryx arcuata.—May 10-2, 11, 16-2, 19, 21-2, 24; June 1-2, 3, 9; July 27.

P. genicula.—July 7, 13, 27-3, 28-2, 31-2; Aug. 2-4, 3-2, 14.

FEMALE OF CROCOTA ROSA, FRENCH.

BY G. H. FRENCH, CARBONDALE, ILL.

In describing this species in Vol. XXII., page 133, of the CANADIAN ENTOMOLOGIST, I had before me two males, one from Texas and one from Ohio. I have now before me a fine fresh female from Champaign, Ill., the first of this sex I have seen, and I will give here some additional characters of the species. The forewings are fawn, a little darker than in the type, but the latter was evidently a little faded. The hindwings have a few dusky scales in the outer border near the anal angle. On the forewings the veins are a trifle darker than the spaces between the veins, but only from the wing being thicker here. Antennae a shade darker than the forewings; a semi-ring back of the eyes that is red tinted, as also the underside of the palpi; upper side of tibiae a little more red tinted. Abdomen above concolorous with the hindwings, an obscure row of dorsal dusky spots; whole of underside of body concolorous with upper side of forewings.

CORRESPONDENCE.

A CORRECTION.

Sir,—On page 225, CAN. ENT., 1892, I described a new Bombycid genus, *Melia*. Finding that this name is preoccupied, I have changed it to *Eumelia*, calling the insect proper *Eumelia Danbyi*, Neum.

B. NEUMOEGEN.

HONEY-BEE OR HOUSE-FLY.

Sir,—The November number of your journal contains upon its first and second pages some rather misleading comments on an article of mine in *Scienee*, of April 29. There was nothing in the article to justify the intimation that I had arranged any insects in a "linear series." The article was in the main a re-statement of Hyatt and Arms's view of the systematic position of the Diptera. To this I added several considerations tending to reinforce their conclusions. I referred to their placing "the Hymenoptera second and the Lepidoptera third," but this does not necessarily imply anything "linear." See their book "Insecta."

So far am I from holding the views imputed to me that I prefer not to regard any of the groups as representing "parallel branches," believing that "we should make an effort to avoid the expression of lineal rank in groups of animals."

I purposely based my conclusions upon anatomy alone, because, as I said, "to introduce the subject of instinct or of usefulness to man, is to confuse our ideas, for we cannot translate the data furnished by such a criterion into terms of the other standard." Judged from that position, it is very much out of the way to assert that "mere specialization is never a test of rank in itself." All that I tried to show was that, anatomically considered, the Diptera are the most highly specialized order.

I trust that it is not out of place to add that the author of one of our principal introductions to entomology, a man whose opinions have as great weight as anyone's in this country, informed his class in entomology last summer that he had come to the conclusion that the Diptera are the highest order. I was so informed by one of his students.

J. M. Aldrich.

Brookings, South Dakota, Nov. 11, 1892.

NOTES.

MELANCHROIA CEPHISE, HÜBN

The genus *Melanchroia* has been associated in our lists with *Gnophaela* to form a family *Pericopidæ*. As a matter of fact it is a veritable geometer, with little more relation to *Gnophaela* than is expressed in the statement that both are Macro-Heterocera! This has, indeed, been recognized in Europe, and Mr. Butler, when identifying my specimens as *M. cephise*, added the remark "belongs to the geometrites".

M. cephise is very common in Kingston, Jamaica, and on Aug. 5, last year, Mr. Bowrey kindly gave me a number of the larvae. These were of the usual form of geometrid larvae, and from them I drew up the following description:—

M. cephise: Larva about 22 mill. long, body smooth, with a few short hairs, which are hardly visible without a glass. Head yellow-brown, the mouth parts dark. Thoracic legs yellow-brown. Abdominal legs tinged yellow-brown. Body pale yellow, with a black ring on each segment, which extends downwards only as far as the infraspiracular line (except that on the 4th body segment, which is continuous below). These rings are broad on the 4th to 8th body segments, but rather narrow on the others. There is a longitudinal, narrow black subdorsal line, and a black infraspiracular line, which broadens into triangles (which are spotted with white) at the junctions with the black rings. The edges of all these black bands are whitish.

The very young larvae are marked in similar way to those which are mature. The pupa is brown and rather shiny. The moths began to emerge on Aug. 15th.

T. D. A. Cockerell,
Institute of Jamaica, Kingston, Jamaica.

HALISIDOTA MACULARIA, WALK.

I find on further search that *H. macularia*, Walk. (see CAN. ENT. Vol. XXIV., p. 306), is made a synonym of *Alpenus maculosus*, Stoll., whose habitat is given as West Africa. The citation of it from North America can only be the result of an error. The occurrence of *Halisidota megapyrrha*, Walk. (= *Ammalo helops*, Cram.), is also doubtful, though not so much so, as its home is in Surinam.

HARRISON G. DYAR, Roxbury, Mass.

ASTATUS BICOLOR, SAY.

In the excellent synopsis of the difficult genus Astatus, by Dr. William J. Fox, published in the September number of this journal, I believe that gentleman to be in error as to his identification of *A. bicolor*, Say. This is an undersized species, not uncommon in Illinois, having the stigma and the contiguous portion of the submarginal vein of a yellowish rufous colour—"pale rufous", Say writes—and not black, as Dr. Fox states; the legs black, as usual. The species described by Dr. Fox as new, under the name *pygidialis*, appears from the description to agree closely with *bicolor*, scarcely differing except in the rufo-testaceous colour of the legs and on the clypeus and antennal scape, which parts are black in *bicolor*. It is possibly an extreme variety of the latter species. I would arrange the synonymy of this group as follows:—

ASTATUS RUFIVENTRIS, Cress.
♀ *rufiventris*, Cress. Trans. Amer. Ent. Soc. IV., p. 218.
bicolor, Fox. CAN. ENT. XXIV., p. 232.

A. BICOLOR, Say.
♀ ♂ *bicoior*, Say. Lec. Ed., I., p. 166.
terminata, Cress. Trans. Amer. Ent. Soc. IV., p. 218.

A. PYGIDIALIS, Fox.
pygidialis, Fox. CAN. ENT. XXIV., p. 234. (? = var. of *bicolor*.

CHARLES A. HART, Champaign, Ill.

BOOK NOTICES.

HISTOIRE NATURELLE DES ARAIGNEES: Deuxième Edition, Par Eugène Simon: Librairie Encyclopédique de Roset, Paris, 1892.

The first portion of Vol. I. of this most important work has just appeared (pp. 1–256). The work will be divided into four parts: 1. External Anatomy; 2. Classification; 3. Biology; 4. Geographical Distribution. Simon arranges the known spiders of the world in 41 families; three families under the suborder *Araneæ theraphosæ;* the remaining families under *Araneæ veræ;* the latter is divided into two

sections—the *Cribellatæ*, with eight families, the *Ecribellatæ*, with thirty families. This portion of Vol. I. contains the External Anatomy and the classification of the *Araneæ theraphosæ* and the *Cribellate* section of the *Araneæ veræ*. The text is illustrated with outline figures. There is no key to the families, but under each family there is a key to the genera, after which follow descriptions of the genera and various remarks. The descriptions of the genera and the keys are in Latin ; the rest in French. Although the classification will, of course, change from time to time, this work will be for many years to come a most important work for arachnologists, and should be found in every college library throughout the world. —N. B.

A Synonymic Catalogue of Lepidoptera Heterocera (Moths) by W. F. Kirby, F. L. S., F. E. S., etc., etc.: Vol. I., Sphinges and Bombyces. London: Gurney and Jackson, 1 Paternoster Row: 1892.

This forms a large volume of 950 pages, including the Sphinges and Bombyces of the world, and brought down to May 1, 1892. There are twenty-nine families recognized, of which the Sphingidæ form the twenty-first, preceded by the Notodontidæ and followed by the Bombycidæ. The Castniidæ head the list, including as the only North American species, the genus Megathymus, heretofore classed among the butterflies. The genus Lagoa, which Dr. Packard has recently proposed should form the type of a new family, is placed in the Liparidæ, between Parorgyia and Orgyia, a most peculiar location. A number of names, long since referred to the synonymy, reappear under their original generic titles in a very misleading manner, as, for example, *Arctia bimaculata* Saunders, placed between *A. f-pallida* Stets. and *A. Nais* Dru., in the genus Apantesis Walk. One would hardly look for *Crocata quinaria* here. On page 36 is a curious error, whereby the noctuid genus *Euedwardsia*, Grote, proposed for *Xanthotrix Neumoegeni*, Hy. Edw., is made to stand for *Edwardsia brillians*, Neum. As both generic names are thus pre-occupied, the Agaristid genus may be known as *Eupseudomorpha* But errors of this kind are hard to avoid in a work of the size of this one ; and the arrangement of the moths of the world under a uniform system of classification makes possible a revision of our North American species to correspond with it. The correction of certain errors in the location of species, with which Mr. Kirby is necessarily autoptically unacquainted, can easily be made, and Mr. Neumoegen and myself have already started on this work.

Harrison G. Dyar.

Mailed January 5th.

LIBRARY OF SCIENCES

The Canadian Entomologist.

VOL. XXV. LONDON, FEBRUARY, 1893. No. 2.

CANADIAN HYMENOPTERA—No. 2.

BY W. HAGUE HARRINGTON, OTTAWA.

COLEOCENTRUS CANADENSIS, n. sp.

Female.—Length, 20 mm. Black, with red legs. Head transverse, as wide as thorax; cheeks as wide as eyes; face slightly swollen below antennæ, clothed with short pubescence, and with the inner orbits faintly yellowish below; palpi and inner edges of mandibles and labrum rufous; vertex and cheeks polished, the area of the ocelli without noticeable depressions or sutures; antennæ long and moderately thick, the joints about forty and subsequal. Thorax polished above; the lobes of the mesothorax prominent, the central sulcate; pleuræ and pectus rugose or subaciculate, but without definite striæ; scutellum moderately large and elevated; metathorax with acute carinæ; the area enclosed by the two discal carinæ about twice as long as wide; in the area enclosed by the two lateral carinæ the elongate spiracle may be plainly seen almost in centre; the areas between lateral and discal carinæ transversely rugose; legs slender with robust coxæ, entirely rufous with exception of hinder tibiæ and tarsi, which are somewhat brownish; wings faintly yellowish, stigma and nervures brown, areolet small, triangular and pedicellate, receiving the recurrent nervure at outer angle. Abdomen sessile, robust, brown rather than black; first segment twice as long as wide, not much expanded posteriorly, faintly sulcate above, with indistinct lateral carinæ; remaining segments shorter, subequal, margined at apex (except last) with pale yellow; the terminal segment compressed and curved so as to partly embrace the ovipositor; ventral scale very large, partly covering three apical segments; ovipositor as long as body, piceous, the sheaths piceous black, very finely pubescent.

Captured at Casselman, about thirty miles south-west from Ottawa, on the 26th June, 1883.

I have much pleasure in describing this insect, as the species of Coleocentrus are rare in collections. All the American forms have been described from Canada, and so far these insects seem to have been found, with one exception, only in our territories.

During a visit to Sudbury, on the 16th of last June, with Mr. Fletcher, we were so fortunate as to take five examples of the fine species described by Mr. Cresson in Vol. I., page 35, of the CANADIAN ENTOMOLOGIST, and named after Mr. Pettit. I find no record of its occurrence during the score of years which has since elapsed, and the two females taken by Mr. Fletcher and the three males which I secured are therefore highly prized. The females were flying near the ground among the fallen timber, upon which they were also seen to alight, and in addition to those captured two or three escaped owing to the rough nature of the ground. The males were hovering about bushes, and were not at first recognized as belonging to this genus, as they differ so much in the shape of the abdomen and in method of flight. A female was also taken by Mr. Evans during our stay with him. As the male has not been described, if indeed previously captured, I append its description in such characters as it differs from the female.

COLEOCENTRUS PETTITII, Cress.

Male.—Length, 17 to 20 mm. Black, shining. Face below antennæ, scape of antennæ beneath and palpi yellow. Antennæ black, nearly as long as the body, the joints both longer and more numerous than in ♀. Legs varying slightly in colour but much paler than those of ♀; the anterior and middle legs, including the tips of coxæ, are almost yellow, as also the posterior tarsi; posterior femora and tibiæ pale rufous, with a more or less defined black stripe down the tibiæ behind. Abdomen slender and compressed laterally, as in some Ophionids; the first segment much narrower than in the ♀; the apex of the last dorsal segment shaped as in ♀.

The posterior tibiæ of the females are not black as in the specimen described by Cresson, but rufous or brownish with a black line externally, as in the ♂.

Our species may be tabulated as follows:—

Head, thorax and abdomen mostly rufous..... *C. rufus*, Prov.

Head and thorax black; abdomen black or brownish.

Antennæ with yellowish annulus..... *C. mellipes*, Prov.

Antennæ black.

Legs, including coxæ, brownish fulvous . *C. occidentalis*, Cress.
Legs rufous, coxæ black ..... *C. Pettitii*, Cress.
Legs rufous, coxæ rufous..... *C. Canadensis*, n. sp.

Of the above species, *occidentalis* is recorded from Vanc. Island, and has been taken in California by Mr. Koebele; *mellipes* from the Rocky Mountains; *rufus* from Quebec (?), and *Pettitii* and *Canadensis* from Ontario.

Another fine genus of the Pimplinæ is Ecthrus, the species of which in general appearance much resemble those of Coleocentrus. The females, however, may be readily distinguished by the absence of the large ventral scale, and by their inflated anterior tibiæ. The shape of the areolet and of the last dorsal segment of the abdomen will separate the males.

ECTHRUS RUFOPEDIBUS, n. sp.

Female. Length, 20 mm. Black, with red legs. Head entirely black; face rugosely punctured and opaque; cheeks and vertex polished, but distinctly punctate; labrum and mandibles polished; palpi black; antennæ long and slender; third, fourth, and fifth joints long, subequal, a white annulus extending from middle of sixth joint nearly to apex of tenth. Thorax immaculate; lobes of mesothorax prominent, polished and punctate, as is also scutellum; pleura and metathorax coarsely rugosely sculptured, posterior transverse carina of metathorax distinct, but areas of disc not clearly defined; wings sub-hyaline, nervures and stigma black, areolet large, pentagonal; coxæ, trochanters and femora rufous, front tibiæ inflated, white, their tarsi almost rufous, middle tibiæ and tarsi brownish, the posterior tibiæ and tarsi black. Abdomen stout, basal segments strongly punctured, the first without distinct carinæ; ovipositor as long as body, rufous, sheaths black, scarcely pubescent.

This fine species was captured by Mr. Winn at Montreal on the 14th June, 1890.

I have prepared the following table for convenience in separating the twelve species of the genus.

FEMALES.

Wings smoky..... *E. ? maurus*, Cress.
Wings banded.
Legs rufous..... *E. nubilipennis*, Cress.
Legs black..... *E. luctuosus*, Prov.

Wings hyaline, or subhyaline.
Abdomen red.....*E. abdominalis*, Cress.
Abdomen red and black.....*E. Provancheri*, Prov.
Abdomen black and white.....*E. pediculatus*, Prov.
Abdomen black.
Antennæ brown, anterior coxæ black...*E. rubripes*, Prov.
Antennæ black, anterior coxæ red.. .*E. nigricornis*, Prov.
Antennæ annulate with white.
Ovipositor long.
Legs black.. .....*E. niger*, Cress.
Legs red.....*E. rufopedibus*, n. sp.
Ovipositor short.
First abdominal segment carinate,
.....*E. annulicornis*, Walsh.
First abdominal segment not carinate,
.....*E. canadensis*, Prov.

MALES.

Abdomen red..... .....*E. abdominalis*, Cress.
Abdomen black.
Legs black..... .....*E. niger*, Cress.
Legs red.....*E. nigricornis*, Prov.

Two of the species are described from the United States, viz., *annulicornis* from Illinois and *nubilipennis* from the Rocky Mountains in Colorado. Ottawa has furnished two, viz., *niger* and *abdominalis* communicated to Mr. Cresson by the late Mr. Billings, and described in CAN. ENT., Vol. I., page 37. Of the former of these, *niger*, I have taken 4 ♀ and 1 ♂, and have found the female ovipositing in decaying maples in June. Provancher also records this species from St. Hyacinthe, Que. The second, *abdominalis*, I have not succeeded in finding here yet, but I was so fortunate as to take a fine female at Sudbury on the occasion of the visit already mentioned. I have also received this species from Rev. G. W. Taylor, of Victoria, B.C., and his specimen agrees in every particular with that from Sudbury. The species *maurus* (doubtfully referred to this genus by Cresson) was described from Victoria, and *Provancheri* was also obtained by Mr. Brodie from Vancouver. The species now described, *rufopedibus*, is from Montreal, and the remaining species, all described by Provancher, are presumably also from the Province of Quebec.

SYNOPSIS OF THE ASILID GENUS BLACODES.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

Up to the present time but a single species of *Blacodes* has been described from the United States: *B. bellus*, Loew, from Texas. I give herewith descriptions of three other species, and present a table to aid in identifying them :—

1 Wings largely hyaline, abdomen and femora black 2
Wings black, abdomen and femora red .....*bellus* Lw.

2 Thorax destitute of a crest of hairs, scutellum bearing only two bristles, tibiæ yellow 3
Thorax furnished with a crest of hairs, scutellum bearing four bristles, tibiæ black .....*cristatus*, n. sp.

3 Anal cell open, second submarginal cell appendiculate .....*truncus*, n. sp.
Anal cell closed, second submarginal cell not appendiculate .....*clausus*, n. sp.

Blacodes cristatus, n. sp., ♀.

Wholly black, the tibiæ slightly piceous. Head light gray pollinose, that in middle of the front dark brown ; face moderately convex, mystax black and white, very dense and extending nearly to the antennæ; first joint of antennæ slightly longer than the second ; third joint lanceolate, three times as long as the second joint ; style slender, slightly over half as long as the third joint. Thorax very convex, gray pollinose and marked with a broad blackish-brown geminate median stripe, which is considerably dilated outwardly behind the middle ; on each side of this stripe is a broad, irregular, blackish-brown stripe extending but little in front of the middle of the dorsum ; the median brown stripe bears numerous black and light yellow pile, which, on the anterior portion, forms a nearly erect crest ; bristles of thorax black and light yellow ; pleura mottled light gray and dark brown pollinose, the pile white ; the fan-like row of bristles in front of the halteres is white. Scutellum brown pollinose and densely white pilose, the four marginal bristles black. Metanotum shining black, a large silvery white spot each side. Abdomen shining bluish-black, marked with light gray pollen as follows : A spot on sides of first segment, a transverse anterior and two posterior lateral

oblique spots on each remaining segment, the anterior spot obsolete on the last two segments, the posterior spots uniting with the gray lateral margin except on the second segment, each extending obliquely inward from the posterior angle of the segment and reaching at least a third of the distance across the segment, those on the sixth segment united; pile of dorsum very short, sparse, depressed, mostly light yellowish, that of the sides and venter longer and white. Pile of legs white, the bristles light yellow; front and hind tibiæ and their metatarsi densely bright yellow pubescent within; spur of front tibiæ rather slender, middle tibiæ also furnished with a strong, nearly straight black spur at the tip within. Wings pure hyaline, the extreme apex gray, a large brown cloud on veins at bases of the first and second submarginal cell, of each posterior cell and of the discal cell; all posterior and the anal cell open, second submarginal cell destitute of a stump of a vein. Halteres black. Length, 11 mm. Ventura County, Cal. A single specimen, in April.

Blacodes truncus, n. sp., ♂ ♀.

Same as *cristatus*, described above, with these exceptions: Tibiæ, extreme apex of femora, and base of each joint of the tarsi, yellow. Pollen of front light gray, mystax very sparse, white; third joint of antennæ almost linear, nearly four times as long as the second. Thorax destitute of a medium crest of pile, scutellum not densely pilose, bearing only two marginal bristles, metanotum uniformly gray pollinose, destitute of silvery spots. Pollen of abdomen, consisting of an anterior cross band on each segment, dilated each side so as to reach the posterior angle of the segment. Brown clouds on wings very faint; base of second submarginal cell furnished with a long stump of a vein. Halteres yellow. Length, 9 mm. Los Angeles County, Cal. Two males and two females.

Blacodes clausus, n. sp., ♂ ♀.

Differs from *truncus* only as follows: In the female the pollen on the abomen is much more extended, covering nearly the entire dorsum, but in the male it is confined to the anterior end and sides of each segment, that on the sides being greatly dilated inward at the posterior corner of each segment. Base of second submarginal cell destitute of a stump of a vein; anal cell closed and short petiolate; brown clouds of wings obsolete or wanting. Length, 7 to 9 mm. Orange County, Cal. Three males and six females.

NOTES ON SOME INJURIOUS INSECTS OF TEXAS.

BY F. M. WEBSTER, WOOSTER, OHIO.

The following fragmentary contributions to a knowledge of a few of the destructive insects of this most interesting State are given here, not so much on account of their present individual value, as for the purpose of drawing attention to the riches in store for the entomological worker who may drift within its borders. In new countries travellers, in passing through, blaze or bark a tree here and there along the way to guide those who may follow after. These notes may be but blazes, but if they prove of aid to others in the future, they will have served their mission. The major portion of the material for this notice has been sent me from time to time by my friend, Prof. Geo. W. Curtis, of the A. & M. College, while others have been received from various other correspondents. To these I have occasionally added some of my own observations, when they seemed to augment the value of those made by others.

Early in May I received a number of twigs of Fig, in which were burrowing numerous larvæ and adult beetles. Of these last there were *Amphicerus bicaudatus*, Say, *Trogoxylon parallelopipedum*, Mels., and a single *Sinoxylon basilare*, Say. The *Trogoxylon* have continued to appear throughout the summer up to date (Sept. 29), while one of the larvæ of *Sinoxylon* has only transformed to an adult within the last few days. As I saw adults on Mesquite, burrowing into the wood, in Llano County, in March,* it would appear that their season of appearance is somewhat protracted, especially as I have since reared them from this same lot of Fig twigs in May, June, August and September.

In April, specimens of *Blapstinus auripilis*, Horn, were sent me from the vicinity of Galveston, where they were said to be destroying watermelon vines, the beetles being found in great numbers on the ground beneath the vines, while the plants withered and died. The beetles were alive when received, and, having no melon vines, I placed them on cucumber, which they refused, but ate the young plants of *Polygonum* which were growing among them. The accusation in regard to the destruction of melons, however, will need to be sustained by further observation, as they might have died from some bacterial or other disease, the beetles, though present, having nothing to do with the disease.

Chinch bugs, *Blissus leucopterus*, Say, were reported abundant in the central southern portion of the State in April, but I have no information

*Insect Life, 3, 454.

of any serious depredations later in the season. An attack on Alfalfa was reported, but, unfortunately, the cause of the trouble was lost in transit, and I can only suspect, from the nature of its work, that it was some species of lepidoptera, probably a Pyralid, though I hardly think it could be *Eurycreon rantalis*. The method of attack on Alfalfa resembles that of the Parsnip web-worm, *Depressaria heracliana*, De G., on parsnip, in that the terminal leaves and stems of the plant are drawn together and held by a web, and within the enclosure thus formed the caterpillar evidently lives, feeding from the tender growth, thereby dwarfing the plants. Prof. Townsend, of Las Cruces, New Mexico, writes me of reports of similar injury in that section of the country, but he has not yet been able to secure specimens of the depredator.

Considerable injury to the Pecan was reported, and specimens of the depredator were sent with samples of the injured Pecans. But, again, the pests escaped, probably to the mail sack, that bourne from which no entomologist's treasures ever return. The worms were reported as causing the shuck enveloping the nut to mould and drop off the tree before they were full grown, thereby rendering them valueless. In Insect Life, vol. 4, p. 78, mention is made of a probably undescribed species of Phycitid, whose larvæ are said to attack the buds of Pecan in early spring. These were sent from the vicinity of Brownwood, Texas, June 17, while the specimens intended for me were collected with the injured nuts, September 14. Whether or not there is any connection between the two remains to be learned.

The Angoumois Grain Moth, *Sitotroga (Gelechia) cerealella*, Oliv., is an every year pest, both in the field and among stored grain. My old experiments, with heat, made ten years ago, and before the use of carbon bisulphide came into application in destroying grain-infesting insects, are less practical than is the use of this fluid drug. The same measure may be used against the Rice Weevil, *Calandria oryzæ*, which appears to be especially abundant among stored corn, and is, so far as my correspondence and personal observation goes, the grain weevil of Texas.

The Bag Worm or Basket Worm appears to be exceedingly numerous the present season in various portions of the State, and the same may be said of Southern Ohio. Of five sent me from Texas, August 11, and placed on trees in my yard, four soon clustered together and spun their fastenings to the same twig, while the fifth amused me by wandering about in a dissatisfied sort of way, and finally going off by itself to an adjacent limb, to which it immediately attached itself permanently.

THE LARVÆ OF THE CLISIOCAMPÆ.

BY HARRISON G DYAR, ROXBURY, MASS.

As has been shown by Mr. R H. Stretch, the North American species of Clisiocampa are best separated by larval characters, and this paper will deal chiefly with them. I refer to Mr. Stretch's paper in volume I. of Papilio, which contains about all that has been known regarding the species.

There are two pretty well defined groups. The first contains *C. disstria*, *C. erosa* and *C. thoracica*, and the second the remaining species. The first are not nest-spinning species; the larvæ rest in bunches on the trunk without covering. The second, with the possible exception of *C. constricta*, of which I have seen no nest, and of *C. incurva*, the larva of which is unknown, are all nest-spinning. Their webs are formed in forks of the smaller branches or twigs, as in the well-known *C. americana* of the Atlantic States. The Eastern region, from the eastern slope of the Rockies to the Atlantic, has two species, one belonging to each group, namely, *disstria* and *americana*. The Pacific Northwest, from the Cascade Mountains to the Pacific, has also two, one to each group, viz., *erosa* and *pluvialis;* but the latter, which takes the place of *americana*, is not its representative, as *erosa* is of *disstria*. The central arid region has but one species at present known to me, unless *incurva*, described from Arizona, be found throughout the range of *fragilis*. *C. fragilis* is the only species not a tree feeder, and this habit has evidently been induced by the absence of deciduous trees in its habitat. California has four species, all endemic, unless it be that *thoracica* is the same as *erosa* of Oregon. Prof. Rivers's description recalls *erosa* most vividly, but he makes no mention of the broad subdorsal blue band so distinct in the larva of *erosa*.

§1. Group *disstria*.

CLISIOCAMPA DISSTRIA, Hübner.

1797—Smith & Abbot, Lep. Ins.,Ga., n. 117, tab. LIX. (as *P. neustria*.)
1816—Hübner, Verz. Bck. Schm., p. 192, No. 1975.
1889—Hy. Edw., Bull. 35, U. S. N. M. (26 references).

sylvatica, Harris.

1841—Harris, R. Ins., 271.

drupacearum, Boisduval.

1869—Boisd., Ann. Ent. Soc. Belg., xii., 82.

Larva.—Black, with ten elliptical white spots on the back, one on each segment, except at the extremities ; a sub-dorsal reddish line ; lateral area largely blue gray, becoming paler below.

Food-plants.—Various forest trees, witch-hazel (Hamamelis), etc.

Habitat.—The Eastern region, from the Mississippi valley to the Atlantic.

[The above description is from notes made several years ago, and is not sufficiently full.]

CLISIOCAMPA EROSA, Stretch.

1881—Stretch, Papilio, i., 67.

1883—Stretch, Papilio, iii., 20 (as larva No. ii.)

Larva.—Head bluish-gray, with small black spots ; hairy ; labrum whitish. Body black,a row of white or orange-tinted dorsal spots,two on each segment, rounded, the posterior one the smaller. In the dorsal space are several supplementary, narrow, orange-red lines, sometimes partly filled in with blue. An orange-red subdorsal line narrowly separated by a black line from a broad blue band, minutely black dotted ; a narrow black line ; a lateral orange-yellow line; below this blue-gray, with traces of a broken yellowish substigmatal line and one along the bases of the legs. Hair, thin dorsally, faintly reddish ; short and dense from the subventral region, silky white with some dusky and reddish hairs intermixed. On joints 3, 4 and 12 the blue subdorsal band is broken by a quadrate black patch, and incised on the other segments.

Food-plants.—Oak, alder, poplar, willow and fruit trees.

Habitat.—The Pacific Northwest.

CLISIOCAMPA THORACICA, Stretch.

1881.—Stretch, Papilio, i., 68.

1889—Rivers, Proc. Cal. Acad. Sci., ser. ii., vol. i., 105.

Larva.—Prof. J. J. Rivers says:—"Body obscure brown ; dorsal ridge ornamented with a row of conspicuous ochre coloured spots, two spots on each segment, the one placed in front always much the larger ; the spots are attended by numerous short waving lines of reddish brown, running longitudinally, and there is a subdorsal line of the same colour and a spiracular line of a much lighter shade. Its whole length, above the feet, is occupied with numerous tufts of grayish hairs."

Food-plants.—Willow and fruit trees.

Habitat.—San Mateo Co., (Stretch); Berkeley, Cal. (Rivers). If Prof. Rivers's determination of the moth is correct, and I see no reason to doubt it, then the name may have to fall as a synonym of *C. erosa;* for the larva is so much the same that there does not seem to be anything in the description to separate it by, unless the subdorsal blue band be really absent.

§2. Group *americana.*

CLISIOCAMPA AMERICANA, Harris.

1797—Smith & Abbot, Lep. Ins., Ga., n. 119, tab. LX. (as *P castrensis.)*

1841—Harris, Cat Ins., Mass., 72.

1889—Hy. Edwards, Bull. 35, U. S. Nat. Mus., 77. (32 references.)

decipiens, Walker.

1855—Walk., Cat. Brit. Mus., vi., 1488.

frutetorum, Boisduval.

1869—Boisd., Ann. Ent. Soc., Belg., xii., 82.

Larva.—Head black, pilose, a few long black hairs ; bases of antennæ and labrum white. Body black with a narrow white dorsal line on joints 3-12, fainter posteriorly and speckled with black. An orange coloured subdorsal band, rather irregular and a little mottled with black. Below this a subdorsal row of blue dots, two on each segment, elongate, the anterior one longitudinal, the posterior transverse. Above and below them is an interrupted orange-tinted line, and below this the lateral area is mottled with pale blue, becoming brownish in the subventral space. Hair reddish brown, most abundant subventrally.

Food-plants.—Wild cherry and fruit trees.

Habitat.—Florida to Canada : west to the Mississippi Valley.

CLISIOCAMPA CONSTRICTA, Stretch.

1874—Hy. Edwards, Proc. Cal. Acad. Sci., v., 368.

1881—Stretch, Papilio, i., 66.

strigosa, Stretch.

1881—Stretch, Papilio, i., 67.

1892—Dyar, Psyche, vi., 326, *pr. syn.*

Larva.—Head powdery blue, with black mottlings ; mouth black, lower part of clypeus white ; antennæ white ringed. Body black, densely

covered with powdery blue over the whole lateral region up to and including the subdorsal blue dots, and leaving only a few black mottlings and a subquadrate black patch on each segment laterally, bordered below by an orange dash. Below the spiracles, the blue becomes nearly white, and anteriorly on the segments tufts of silky white hair grow from the skin. Traces of a subventral orange shade. Dorsum black without a dorsal line, the usual pair of orange subdorsal lines narrow and irregular, heavier at the posterior part of each segment. Considerable conspicuous orange tinted hair grows on the back.

Food-plant.—Oak *(Quercus Kelloggii).*

Habitat.—The more hilly parts of California.

CLISIOCAMPA AMBISIMILIS, *nov. sp.*

Larva.—Head pale blue, with numerous black spots especially at the vertex; labrum and basal joints of antennæ yellowish-white; many white hairs. Body black, largely mottled with pale blue-gray at the sides and a series of subdorsal blue dots, two on each segment, the posterior one of which is produced downward into a transverse dash reaching the lateral blue region. A dorsal bluish-white line, much broken, but irregularly so; in some specimens it is continuous from joint 3 posteriorly, in others widely broken in the segmental incisures or entirely absent. A subdorsal series of waved, broken, orange lines, triple or quadruple on the posterior part of each segment, single anteriorly. A paler broken lateral line just above the blue area. Hair quite dense, keeled slightly dorsally and tufted laterally, red on the back, but silky white on the sides, as in *C. constricta.*

Food-plants.—Fruit trees.

Habitat.—Santa Cruz Co., California.

This species occurred to me abundantly on fruit trees at Watsonville, Cal., but the native food-plant was not determined. The larvæ are closely related to *C. constricta*, differing in the presence of the dorsal line (though this is not constant) and in the greater restriction of the lateral blue area, which does not extend up to and enclose the subdorsal dots, as it does in *C. constricta.* The moths are very different. The ♂ is rusty brown, with two pale lines, the ♀ pale brown, with two darker lines. My specimens are too poor to enable me to give characters to separate the moths from *C. californica*, which they much resemble; but the larvæ are abundantly distinct. Besides the marked difference in markings, the contrast in the colour of the lateral hairs of the two species is striking. Dr. Packard has

probably confounded this species, as well as *C. fragilis*, with *C. californica* in the 5th report of the U. S. entomological commission.

CLISIOCAMPA CALIFORNICA, Packard.

1864—Packard, Proc. Ent. Soc. Phil., iii., 387.

1877—Packard, Inj. Ins. West, 807.

1881—Stretch, Papilio, i., 64.

1890—Packard, 5th Rept. U. S. Ent. Com., 120.

pseudoneustria Boisduval.

1869—Boisd., Ann. Ent. Soc. Belg., xii., 82.

Larva.—Head black, very hairy except where the ocelli are, sometimes tinged with powdery blue in front; labrum whitish. Body entirely black, except the tips of the abdominal feet, which are pale, covered with long, fulvous hair, quite thick, especially dorsally, where it is keeled, and laterally, where it is tufted anteriorly on the segments. Almost entirely without marks; some have an irregular red subdorsal line, interrupted between the segments and narrowly centrally on each segment, mottled with the ground colour; while all have a series of subdorsal small blue dots below the red line, only one on each segment, and sometimes a lateral series of red dashes. In some even the blue dots are obscure and wanting on the central segments.

Food-plants.—Oaks (*Quercus agrifolia* and *Q. lobata*).

Habitat.—The coast region of California.

Dr. Packard has confounded *C. fragilis* with this species, if not others also, and consequently gives it a habitat much too extended. *C. fragilis* is abundantly distinct from *C. californica* in the larva, and, though the ♂ moth is very similar, the ♀ shows good specific differences.

CLISIOCAMPA FRAGILIS, Stretch.

1881—Stretch, Papilio, i., 64.

1888—Hy. Edw., Ent. Amer., iv., 62.

1890—Packard, 5th Rept. U. S. Ent. Com., 120 (as *C. californica.*)

Larva.—Head blue gray, dotted with black, mouth and ends of antennæ black, labrum and bases of antennæ sordid white. Body with the ground colour black, a broad pale blue dorsal band, broken at the segmental incisures and narrowed a little at both ends of each segment, absent on joints 2 and 13. Orange subdorsal marks much reduced, scarcely noticeable, consisting of from one to three narrowly linear, waved and broken streaks. Subdorsal blue dots, two on each segment, very large, subquadrate, either separate or confluent on their upper sides,

or also confluent with the lateral blue-gray area, but always leaving a row of black patches, one in the middle of each segment. A faint, lateral, pale orange or whitish line, broken and bordering the black patches below. Below this line to the legs, blue-gray, mottled with black, with traces of a whitish substigmatal line and one along the bases of the legs. Venter black, immaculate. Thoracic feet black, the abdominal ones pinkish at tips. Hair moderately abundant, faintly reddish tinged on the back, white on the sides, but rather thin and not tufted.

Food-plants.—Wild gooseberry (Ribes) and rose (Rosa.)

Habitat.—Nevada, Montana, Wyoming, Colorado, and probably all the arid region from the eastern slope of the Rockies to the Sierra Nevada and Cascade Mountains.

CLISIOCAMPA PLUVIALIS, *nov. sp.*

1883—Stretch, Papilio, iii , 20 (as larva No. 1).

Larva.—Head hairy, bluish-gray, spotted with black, the spots segregating on the vertex, or covering nearly the whole head; labrum and bases of antennæ yellowish white. Body black, a pale blue dorsal line, divided between the segments, obsolete at the extremities, and forming 9 rather narrow, elongate, blue spots tapering at their ends, exactly as in *C. fragilis.* A subdorsal row of blue dots, two on each segment, the anterior one the smaller, and not reaching quite so far down. Between these is an orange band, starting in a small spot on the anterior part of each segment and either broken or connected with a broad triangular widening of the band on the posterior part. A distinct, broad, but rather irregular, pale orange, lateral band, narrowly broken here and there, and containing a few black dots. Below this, a slight suffusion of blue, mottled with black, and a diffuse and mottled pale orange substigmatal band, besides another along the bases of the legs. Below, black, with a double diffuse and mottled bluish band, or the venter all mottled with bluish white. The subdorsal orange band is very conspicuous. It may extend from near the dorsal line to below and behind the subdorsal blue spots and also in front of them, but is usually less on the anterior part of the segments and always retracted centrally. Its dorsal edge is well defined, a little curved on each segment, following the outline of the pieces of the dorsal band, but always separated from them by a black space, though it sometimes nearly surrounds them by connecting over the dorsum with the band on the other side, posteriorly on the segments. In some examples the region below the subdorsal band to the venter is largely overspread

with orange, mottled with the ground color, most heavily just below the subdorsal band. Hair not thick, reddish, both on the back and sides.

Food-plants.—Alder *(Alnus)*, apple, etc.

Habitat.—The Pacific Northwest, from the Cascade range to the sea. Found abundantly at Seattle, Washington, and rarely at Portland, Oregon.

The moths do not differ from Stretch's description of *C. fragilis*, except that in the ♀ there is no broad, brown band on the forewings, but a diffuse shade outward from the inner dark line ; in some specimens also bordering the undulated pale outer line. A larger series of specimens than I possess will probably show further differences, though the species is closely related to *C. fragilis*.

CLISIOCAMPA INCURVA, Hy. Edwards.

1882—Hy. Edw., Papilio, ii., 125.

The larva of this species is unknown. I have examined the moths in the collection of Mr. B. Neumoegen, and they seem closely allied to *C. fragilis*. They differ from any other species of this group in that both sexes are pale. The male is suffused with brown on the forewings, the lines pale, bordered inside with brown, so that in pale specimens the lines look brown. The female is the same, but browner, so that the lines are always pale, the outer waved, the inner sometimes rather faint, so that its brown edge is the more distinct. In both, the brown is deeper between the lines than outside them. I am not inclined to give much weight to the character from which the species was named. *Clisiocampa*, like *Datana*, cannot be separated by the position or shape of lines, but by the difference in the relative coloration of similar markings. In *Clisiocampa*, both sexes are needed for a determination. The following table will separate the larvæ here described. *C. incurva*, only, is unknown.

§1. A dorsal row of rounded spots.
One spot on each segment, - - - *disstria*, Hbn.
Two spots on each segment.
A broad, distinct, subdorsal blue band, - *erosa*, Str.
No distinct subdorsal band? - - *thoracica*, Str.

§2. A dorsal line, continuous, broken or absent.
A continuous, narrow white line, - *americana*, Harr.
Dorsal line, if present, not white ; often absent.
Line irregularly broken or absent.
Lateral region heavily blue shaded.

Blue inclosing the subdorsal dots, *constricta*, Str.
Blue not reaching the dots, *ambisimilis*, Dyar.
Lateral region with no blue shade, *californica*, Pack.
Line forming a row of elliptical blue spots.
A slight subdorsal orange band, - *fragilis*, Str.
A heavy orange band, - - *pluvialis*, Dyar.

ASTATUS BICOLOR, SAY.

BY WILLIAM J. FOX, PHILADELPHIA.

In reply to Mr. Charles A. Hart, who has shown, in the last number of this journal, that in his opinion I am in error regarding the identification of *Astatus bicolor*, Say, I would say that the stigma of the ♂ only is "yellowish-rufous", while that of the ♀ varies from reddish-black to deep black. If he will again consult my synopsis of the genus Astatus he will find that I used the words "stigma of wings black" in separating those of the female sex. In regard to my new species, *A. pygidialis*, which Mr. Hart suggests may be an extreme variety of *bicolor*, it differs not only in the slight characters mentioned by him, but also in the shorter and triangular pygidium, and the more feeble armature of the legs; the scutellum is not furrowed down the middle, and the insect itself is much smaller. Although it *might* prove to be but a variety of *bicolor*, nevertheless a series of nineteen specimens of that species and three of *pygidialis* show no intergradation, and therefore I think I was justified in describing it as new. I would rearrange the synonymy suggested by Mr. Hart as follows:

ASTATUS BICOLOR, Say.

A. bicolor, Say. Lec. Edition, I., p. 166, ♀ ♂.
A. rufiventris, Cress. Tr. Am. Ent. Soc., IV., p. 218, ♀.
A. terminata, Cress. ibid., p. 218, ♂.

A. PYGIDIALIS, Fox.

A. pygidialis, Fox. CAN. ENT., XXIV., p. 234, ♀.
A. bicolor, Hart, (not Say). ibid., XXV., p. 27.

NOTE UPON THE REVISION OF THE GENUS CUCULLIA.

BY AUG. R. GROTE, A. M., BREMEN, GERMANY.

The "Revision of the Genus Cucullia," by Prof. Smith, in Proc. U. S. Nat. Mus., XV., pp. 33, *et. seq.*, raises the number of described North American species to 14, and is an interesting addition to the knowledge of our *Noctuidæ*. Larger collections from the west have come to hand since my study of the species and have admitted of fuller comparisons. Although the species of *Cucullia* are not among the commonest Owlet Moths and seem to fall less easily a prey to the collector's efforts than those of many other genera, still we may conclude that the above figures give, at least approximately, the N. American representation of the genus. In a comparison of the faunæ of Europe and North America* I have sought one distinction in the smaller representation of the Hooded Owlets in America. Whereas in other leading genera, such as *Apatela (Acronycta)*, *Hadena*, *Mamestra*, *Agrotis*, *Oncocnemis*, *Lithophane*, *Plusia*, *Catocala*, the North American species are much the more numerous; in *Cucullia* the proportion is reversed, and we have only 14 American to 43 European species of the genus. Of a truth we seem to have only 12 species which represent structurally the European forms. Two of our species *(bistriga* and *serraticornis)* I have no doubt (from figures and descriptions, as well as my own observations upon the Californian form) will come to be separated generically, or at least subgenerically, from the rest. There appear to be no analogues to these two species in the European fauna.

It is noteworthy that our North American species belong, in the main, to the groups represented in Europe by *Blattariæ*, *Asteris* and *umbratica*. No North American representative of the group of *Scopariæ* appears to be known, and, in particular, the silvery group containing *argentea* is wanting with us. Our western plains have this in common with the Russian steppes that they produce *Heliothini* in abundance, and when the description of *Cucullia luna*, Morrison, appeared, I was induced to believe that we had also found an American silvery species of *Cucullia*, allied to *argentina* from Astrachan or *splendida* from the Ural and Altai. But it now appears that this species of Mr. Morrison's is my *Epinyctis notatella*, a genus referred by me originally to the white Heliothians, among such forms as *Pippona* and *Antaplaga*, and where, from its structure, I believe still it most naturally belongs. At nearly the same time the moth was

*See Grote: "Die Verwandtschaft," etc., Verh. Gesell. Deutsch. Naturf., 2te1 Theil, pp. 148–154, Leipzig. 1890.

published by Prof. Smith as a new genus, but "closely allied to *Cucullia*," under the name of *Nyctophœata*. These facts, which are of interest in a comparison of opinions upon one and the same Noctuid, are obscured by Prof. Smith's brief statement that "the species described as *luna* by Mr. Morrison is an Heliothid", l. c. p. 37. According to Smith, Bull. Br. Ent. Soc. 45, it "should stand between *Cleophana* and *Cucullia*".

If, then, we really possess a silvery *Cucullia*, it has yet to be discovered. Such a form must be looked for in the west, in the States and Territories adjoining the Rocky Mountains, and, probably, on the eastern side of the range. But not improbably such forms, so much prized by European collectors, are entirely wanting in our fauna; while, although breeding and more extended research may turn up new species, it may be concluded that we shall finally remain much behind Europe in the total number of our native species of *Cucullia*. This fact is important in a study of geographical distribution. We know too little as yet to generalize upon its probable cause. The species of *Cucullia* run often closely together and are also confined, it would sometimes appear, to single kinds of food plants. I content myself here with calling attention to the circumstance. Upon the following species I would make some notes in reference to Prof. Smith's remarks:—

Cucullia convexipennis, G. & R.

No mention, or I have overlooked it, is made in the Revision of the somewhat peculiar shape of the wings, to which this species owes its specific name. I should have been glad had I been able to note that our observations in this respect had been verified. On the whole, this seems our most striking species yet discovered.

Cucullia florea, Guen.

The specimen of this species, referred to on page 45 of the Revision as "from Dr. Lintner", was given by me, with the above determination, to Dr. Lintner when he was studying that genus, as also the types of *serraticornis*. This unique specimen, which I had determined as *florea*, agreed fairly with Guenée's figure and description, and Dr. Lintner had not recognized the species elsewhere when I gave it to him from my collection. The specimen was, I believe, from New York State, but I had lost the exact locality. I believed that I had collected it myself at a time when my attention was not especially directed to the genus. Afterwards, finding the specimen in my duplicate boxes, I determined the same with-

out being certain of its origin. This species, from its grayer colour, is readily distinguished from *postera* or *asteroides* (*i. e. star-like ?*, a queer title for the moth ; the Latin name was probably meant to refer to the European *Asteris* or to the botanical genus *Aster*, a food plant for some of the species) and must be quite uncommon. I never saw a second example.

Cucullia lætifica, Lint., in Grote Check List (1875).

In describing the type of *cita*, from Arizona, I had no longer specimens of *lætifica*, from Texas, for comparison. The discovery of *montanæ*, Grote, had led me to expect new western forms of the genus, and in the present instance the sexual difference in general colour assisted my mistake. I have no doubt that the reference in the Revision is correct, and that the Texan species extends its range to Arizona. I do not know Prof. French's species, also referred here. With regard to *Cucullia solidaginis*, Behr., in Strecker, if my memory serves, I had a note upon it to the effect that it did not belong to this genus. If so, we have as yet no typical species of *Cucullia* known from California or west of the Rocky Mountain range. I must concur with Mr. Smith's remarks upon the descriptions of Behr. in Strecker.

In my opinion the *Cucullini* form a tribe of the *Noctuinæ*, sufficiently characterized by comparative characters. These consist in the elongate wings, the tapering abdomen, the fine and smooth vestiture, the hooded collar, the pencilled anal tuft, the short and unarmed legs, naked and lashed eyes. The European species have, in the group of *Scrophulariæ*, the fringes of primaries dentate. The rest, with the American forms, seem to have them even. The usually smooth larvæ are very distinctly marked, but are not easily distinguished upon the food-plant. In habit and character they resemble *Heliothis* somewhat. The flower of a purple double aster I had here, blooming in a pot on my window-sill, contained the coiled and partially hidden full-grown larva of one of the European species, which I did not discover for some days. The pupation is effected in the ground in a dense cocoon mixed with earth, the moth appearing in the spring. The larvæ, when disturbed, often make a jerking motion, reminding me of that of the Hawk Moth, *Thyreus Abbotii*. It must indeed be said that the moths are not without some resemblance to the *Chærocampinæ*.

In my Revised Check List of 1890, I have given eleven species of *Cucullia*. The list must now be changed to include the following fourteen apparently valid names :

1. convexipennis, *G. & R.*
2. montanæ, *Grote.*
3. similaris, *Smith.*
4. obscurior, *Smith.*
5. asteroides, *Guen.*
6. postera, *Guen.*
7. florea, *Guen.*
8. lætifica, *Lintn.*
9. Speyeri, *Lintn.*
10. dorsalis, *Smith.*
11. intermedia, *Speyer.*
12. cinderella, *Smith.*
13. bistriga, *Smith.*
14. serraticornis, *Lintn.*

A TRYPETID BRED FROM GALLS ON BIGELOVIA.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

A round, white, woolly gall was found on stems of Bigelovia (sp. probably *graveolens*) in several localities in western New Mexico the past summer, from June 19 to 22. Those found June 19 were old galls, and were met with near Luera Spring, in Socorro county. On June 21 the fresh galls were found in numbers near Gallo Spring. Sometimes two or three were found near each other on the same stem or twig of the plant, and in one case three galls were found joined together, forming a triple gall. On June 22 they were found extremely common west of Apache Spring, thus seeming to increase in number in a westerly direction, as did also the patches of Bigelovia, every plant of which was full of them. The last two localities are on the Pacific slope of the Continental Divide, the first locality (Luera Spr.) being to the east of the divide about 40 miles.

Many of the galls found June 22 were opened at the time and disclosed several hymenopterous pupæ which were at first taken for the gall-maker. Some also contained a small white larva, probably belonging to the hymenopteron. Most of the galls, however, contained puparia which were taken for those of a tachinid, but which were in reality the puparia of a trypetid and the original gall-maker. None of the puparia were noticed to contain the fly, and numerous galls that were picked and kept in pill boxes for several months developed no trypetids. It was later found, however, that two of the puparia extracted from the galls at this date and placed in alcohol contained the pupa within. The credit for the breeding of the fly is due to Professor C. P. Gillette, who sent me speci-

mens of the fly and gall. Several flies were bred by him from galls which he collected at Dolores, Colo., June 18, the flies issuing June 19. The following is a description of the gall made by Professor Gillette at the time :—

Galls sub-globular in form, varying from ¼ to ½ inch in diameter, and borne singly along the side of the stems of Bigelovia. They are very light in colour, being densely covered with a short white woolly hair. Beneath this fuzz the substance of the gall is greenish in colour and quite brittle. At the centre of each gall is a single larval cell containing, at this date, the puparium of some fly. From the larval cell a burrow leads to the woolly outer covering, which it never penetrates, and it cannot be seen from the outside. The galls are very common.

I have little to add to this description. The galls which I collected measure (dried) from 8 to 11 mm. in diameter, the average being about 9 mm. The wool is extremely fine in texture. As before stated, they were often approximated to each other on the same stem. Their form seems to indicate more or less plainly a bud-like growth, and they very often show the opening of the larval burrow on the outside.

I have referred this trypetid to the sub-genus *Eurosta*, Loew, because it seems to come nearest to this group of species, though it does not entirely fit the characterization. The fifth vein is not bristly, scutellum has only two bristles ; the front is what I should call very broad, perhaps not "remarkably" so ; the third antennal joint is short, but the ovipositor seems to be somewhat flattened instead of conical. The following is a description of the species :—

Eurosta (Trypeta) *bigeloviæ*, n. sp. ♀.

Wings do not resemble any figured by Loew in monographs ; they are very pale at base, rest blackish fuscous, except the white reticulations, and a slightly flavous portion near centre, and a little approximated to costa, being situated in basal portion of submarginal, distal portion of first basal and proximal portion of apical cells ; a white spot on costal margin before and just reaching the costal spine, before this an elongate transverse white spot extending from costa back to posterior (second) basal cell, and bordering on the pale basal portion of wing ; on costa in marginal cell two white spots, the inner one just beyond and at extremity of first longitudinal vein, the outer one more elongate transversely and

extending nearly across submarginal cell, the inner one wholly in marginal cell; marginal cell more or less pale, at least on costal portion; submarginal cell with a longitudinally elongate, slightly cresentic pale area in its apical portion; an elliptical, longitudinal white spot in first (anterior) basal cell at its distal two-thirds just the width of cell; a round white spot nearly in middle of widened distal portion of discal cell, a little approximated to anterior border of cell; a transversely oblique, somewhat elongated white spot in apical cell on its distal two-thirds, but little separated at its posterior end from a similar spot in distal portion of second posterior cell, which, however, reaches hind margin, where it slightly widens, these two spots having the same oblique direction pointing outward toward the hind margin of the wing; a large inverted V-shaped white spot nearly in middle of second posterior cell, a little nearer base, slightly bulged on its inner (toward base of wing) margin, and its prongs reaching hind border of wing; two smaller, quite widely separated white spots bordering on hind margin in distal portion of third posterior cell, the outer one touching fifth longitudinal vein near its extremity; a large, white spot a little before middle of third posterior cell, extending from anterior border of cell back through fourth posterior cell to hind margin of wing; a small, rather triangular white spot in extreme basal portion of third posterior cell and nearly behind the elongate marking above referred to as bordering on the pale basal portion of the wing; anal angle broadly white, extending into the anal cell, and joining the pale basal portion; wing veins at base, including the costal vein where it borders the white spots, pale yellowish; halteres pale yellowish.

Head, including front, frontal bristles, face, antennæ, cheeks, proboscis, and palpi, pale yellowish, arista slightly darker apically and bare; occiput darker on upper central portion; eyes blackish (are probably green in life); second and third antennal joints of nearly equal length, palpi enlarged apically and tips reaching to tip of proboscis; front narrowed anteriorly, on vertex more than one-half width of head; front set on ocellar area; anterior portion of orbital margins and vertex with short pale yellowish bristles, including a row on each side descending obliquely inward from vertical angles, meeting in centre and forming a V, also with a pair of long, nearly erect bristles on vertical margin, and three shorter, sub-appressed, inwardly directed pairs on anterior orbital margins. Thorax blackish, dorsum and pleuræ, including scutellum, thickly set with short,

pale yellowish bristles, some long yellowish bristles on pleuræ and posterior dorsum of thorax, and a long pair arising from sides of scutellum; scutellum blackish at base, pale yellowish on margin and apex. Abdomen rufous or dark fulvous, anal segment black, ovipositor rufous. Legs entirely pale yellowish.

Length of body (incl. ovipos.), 5 mm.; of wing, nearly 4½ mm.

Described from one specimen bred by Professor C. P. Gillette from galls collected at Dolores, Colo., June 18. Issued June 19.

An imperfectly-hardened ♀, which I collected in Johnson's Basin, in Western Socorro county, N. M., June 23, differs in the lighter abdomen, rufous anal segment; the more grayish short bristles of thorax, and darker long bristles of thorax and scutellum; in the oblique white marking of apical cell being united with the distal one of second posterior cell; and by the large inverted V-shaped marking of second posterior cell being represented by an oblique elongate marking parallel to the preceding, and a short marking inside it, both bordering on the hind margin of wing. It will need more material to establish the distinctness of this specimen.

Puparium of *E. bigeloviæ*, containing pupa: Length, 4 mm.; greatest width, 2¼ to 2 2-5 mm. Stouter posteriorly, rufous on posterior portion and brownish anteriorly, eyes and wings of pupa showing beneath puparium as black spots. Puparium showing twelve segments, counting anal and capital plates. Mouth parts of larva showing in centre of capital plate at anterior end of puparium as a very small, central, raised circle, with usually eight primary radiating ridges, their length less than twice the diameter of the circle, these ridges longitudinally and often deeply fluted, giving appearance of smaller, more numerous ridges; a pair of circles exactly similar to the central circle placed on outer margin of the area of radiating ridges, a little dorsally of the central one, and with it forming the three corners of a triangle; from the central circle there extends ventrally a linear, elongate, forked black body seen beneath the integument of the puparium. Anal stigmata showing in centre of anaplate as a pair of small blackish spots, each bearing three principal black tubercles arranged in a slightly crescentic form with the convexity ventral, and a smaller black tubercle in concavity of each crescent, one or more other still smaller ones sometimes apparent; a small, depressed median

orifice slightly dorsal to the pair of stigmata, and a third less distinct median stigma considerably removed ventrally from the pair.

Described from two alcoholic puparia taken from galls collected near Apache Spring, June 22, and containing pupæ.

The hymenopterous larvæ and pupæ which I found in the galls, June 22, and which are undoubtedly those of a parasite of the trypetid, consisted of two small larvæ, and a ♂ and ♀ pupa, the latter at once distinguished by the long ovipositor curved forward over her back. This parasite seems nearly to equal its host in size.

The larvæ, in their partially curled position, measure 2½ to 3 mm. long, and fully 2 mm. wide; tapered suddenly toward head and quite so toward anal extremity; whitish, very pale dilute yellowish after immersion for some months in alcohol, mouth parts blackish.

♀ pupa, 4 mm. long, 1½ mm. wide; ovipositor curled forward over back, reaching tip of scutellum; after immersion in alcohol pale fulvous, abdomen at base and eyes blackish. Ovipositor, in its curled position, measures nearly 3 mm.

♂ pupa, 3 mm. long, scarcely 1 mm. wide; pale fulvous, eyes black.

It should also be mentioned that there was bred from the galls collected near Gallo Springs, June 21, a very small weevil less than 3 mm. in length, perhaps an inquiline in the galls. The galls were left attached to very short pieces of the stems, but it is not likely that the weevil came from the stems, which are very small. Moreover a careful examination of the stems with a lens shows no exit hole whatever in them.

NOTE.—Since writing the above, I have found that Mr. Theo. D. A. Cockerell records, on page 106 of West American Scientist, vol. 6 (Sept., 1889), the breeding of a cecidomyiid "from woolly trypetid galls on *Bigelovia*." Mr. Cockerell has also sent me a small gall of this species, with the following note: "Gall of *Trypeta bigeloviæ*, Ckll., Ent. Mo. Mag, 1890, West Cliff, Col." I have not seen Mr. Cockerell's mention of this species in the Ent. Mo. Mag, and do not know whether he described the fly or only the gall. At all events the discovery of the trypetid nature of the gall belongs to him. When I named the trypetid as above, I did not know that the same name had been proposed for the same insect by Mr. Cockerell.

THE MEMBRACIDÆ OF ST. VINCENT ISLAND, W. I.

BY F. W. GODING, M. D., PH. D, RUTLAND, ILL.

The material forming the basis of this paper was sent to me last October by Prof. C. V. Riley for determination. The species were collected by H. H. Smith in St. Vincent, West Indies, and are among the most interesting forms of this remarkable family.

Subfamily CENTROTINÆ, Stal.

1. *Monobelus fasciatus*, Fabr.

♂. One example in National Museum.

Subfamily SMILIINÆ, Stal.

2. *Acutalis trifurcata*, n. sp.

♀. Head greenish-yellow, with an oval spot in the middle (in which are the ocelli), and a curved black line around the apex; prothorax shining greenish-yellow, a broad line ending just before the apex, at its middle sending toward the front a line, on each side, which does not reach a line through lateral angles, these lines together resembling a three-tined fork; median line behind this fork much broader; at base of median line a broad line branches from each side backward and outward in the form of an arrow-head; base of prothorax very narrowly shining black; tegmina very pale yellow, veins indistinct; chest, femora, tibiæ and tarsi dark brown. Length, 3 mm.; width, 1½ mm.

Described from one female; type in National Museum.

This species is near *Illinoiensis*, Godg.

3. *Acutalis apicalis*, n. sp.

♂. Shining black, with a submarginal yellow line on each side, originating at the apex of head it extends posteriorly nearly to apex of prothorax, where it converges towards the line on the opposite side, but they do not come together; apex bright yellow; lateral angles of prothorax produced in small tubercles; tegmina light yellow, veins darker Legs light brown, tarsi annulate with brown.

Length, 3 mm.; width, 1½ mm.

Described from one male; type in National Museum.

This species is near *flaviventris*, Leth. It may prove to be the ♂ of *trifurcata*, Godg.

Subfamily MEMBRACINÆ, Stal.

4. *Sphongophorus (Lobocladisca) vexillifera*, n. sp.

Sex (?) Dark brown fuscous; very densely and coarsely punctured. Head vertical, nearly quadrangular, a little longer than the width between

eyes; eyes small, brown; ocelli on a line with superior edge of eyes, to which they approach nearer than to each other. Prothorax in front convex, armed with a long, slender, nearly upright compressed horn, leaning slightly forward, seen from side, slightly sinuous and armed near middle of posterior edge with a small tooth; seen from front, thinly compressed, and at apex bidentate, the small teeth divaricate; behind anterior horn near middle of posterior process is a medium sized, compressed, rounded lobe, which, when seen from side, resembles the helmet of a huzzar, the top of which has a sharp, slender, needle-like spine pointing upward; behind the base of this lobe the posterior process extends backward in a low, small, triangular process, placed vertically, with a slender spine extending posteriorly from the base. Lateral angles very prominent; front margin arched to receive the head, the sides of prothorax extending downward in ear-shaped lobules behind the eyes. Elytra ferruginous, with a large black spot across the middle. All the tibiæ very widely dilated and thin.

Length, 6 mm; to tip of tegmina, 7 mm.; breadth, 3½ mm.; altitude, 6 mm.

Described from one example, the sex of which could not be determined without mutilating it. Type in National Museum.

This is nearest to *rigidus*, Stal. It belongs to Stal's subgenus LOBOCLADISCA, which with its related subgenera are characterized as follows:—

[PHORUS, Fairm.
Posterior prothoracic process unarmed at the middle.....Subg. SPHONGO-
Posterior prothoracic process armed at or near middle with a process.

Anterior horn undate, lengthily curved backward, posterior or inferior edge unarmed..... ..... CLADONOTA, Stal.

Anterior horn substraight, not curving behind lobe of posterior process, posterior or inferior edge armed with a tooth or lobe .... .LOBOCLADISCA, Stal.

5. Sphongophorus (Cladonota) albofasciata, n. sp.

♂. Blackish-brown, coarsely and roughly punctured, tuberculate. Head longer than wide, inferior edge 3-lobed; ocelli on a line with superior edge of eyes, red, nearer to eyes than to each other, and near base of prothorax. Prothorax highly convex, armed anteriorly with a horn which at first extends upwards, strong and stout; from posterior superior angle it extends, slender and thread-like, posteriorly upward and backward for another third, then it suddenly enlarges in a nearly quadrangular, com-

pressed, foliaceous lobe, having a tooth extending posteriorly ; this lobe is compressed in centre with a diamond-shaped outline at the posterior edge ; about the middle of the posterior process is a cylindrical upright horn, constricted on sides at middle, the upper part produced anteriorly and receives the foliole of the anterior horn which rests upon it ; behind this horn the posterior process is slightly enlarged towards apex, where it is truncated diagonally downward and backward. Elytra light brown ferruginous, with a white band extending across the middle. Tibiæ all all widely dilated.

Length, 5 mm.; altitude, 3½ mm.

Described from one male. Type in National Museum.

6. Bolbonota (Tubercunota) bispinifera, n. sp.

♂. Black, covered with auriferous pubescence finely tuberculated. Head longer than wide, sides of face dilated ; ocelli on a line with eyes and near base of prothorax, nearer eyes than each other. Prothorax highly convex anteriorly, behind elevated portion strongly declivous ; at upper edge of declivity is a short, cylindrical spine pointing upward and backward, and between this and apex of posterior process is a larger transverse spine pointing directly upward ; lateral angles produced in tubercles, above which are two little elevated lines on each side, the superior one reaching middle of inferior border of prothorax, diverging posteriorly, the surface between these and median carina smooth. Tegmina with basal portion black, remainder hyaline, veins black. Anterior pair of legs dilated, middle and posterior pairs triquetrous, with strong spines, dark brown.

Length, 1½ mm.; breadth, 1 mm.

Described from one male. Type in National Museum.

It is near *bituberculata*, Stal., and *inæqualis*, Fabr., and belongs to the subgenus TUBERCUNOTA, Godg., which with its relative may be distinguished by the following table :—

Posterior process of prothorax behind middle furnished with a high transverse tubercle or spine, more or less compressed antero-posteriorly ; anterior part strongly and gradually elevated up to middle.....Subgenus TUBERCUNOTA, Godg.

Posterior process from apex, seen from side, depressed, in front of depressed part dorsum straight or lightly uni- or bi-sinuate .....Subgenus BOLBONOTA, A. & S.
(Types *melaena*, Germ., *aureo-sericea*, Stal.)

The type of the subgenus TUBERCUNOTA, Godg., is *bispinifera*, Godg., which is the smallest known member of the genus.

7. Enchophyllum (Tropidocera) Rileyi, n. sp.

♂ and ♀. Head black; prothorax beautiful orange-red, the anterior horn and a stripe passing downward from it, on each side, forks, one branch in front and one behind lateral angles, the front branch extending to eye, the hind one spreading out for a little distance along inferior border, in some examples, all the way to apex, black. Tegmina opaque brown-black, veins distinct. Legs black, front and middle tibiæ dilated, posterior tibiæ triquetrous and spined.

Length to tip of tegmina, 6 mm., including anterior horn, 10 mm.; altitude, 3 mm.

It belongs to Stal's subgenus TROPIDOCERA near *quinque-maculatum*, Fm. I take pleasure in dedicating this, the most beautiful member of the genus, to my esteemed friend, Dr. C. V. Riley, who kindly presented me with the types and who has aided in many ways my studies of this difficult group.

Types in collection of F. W. G., and National Museum.

Described from five examples.

A STATEMENT IN CORRECTION.

BY AUG. R. GROTE, A. M.

In that most useful paper, the "Directions for Collecting and Preserving Insects," by Dr. C. V. Riley, Washington, 1892, occurs the statement, on page 137, that the periodical, the North American Entomologist, was "published by the Buffalo Society of Natural Sciences." The fact is that the little monthly, which only reached its first volume, was edited by myself, and printed and published by Reinecke & Zesch, a Buffalo printing house. The material was written or collected together by myself, and the few plates, mostly contributed by the authors, were gotten up at my sole trouble, and even expense. I corrected the proofs and had sole charge of the periodical, which was intended to include short articles and reviews of current literature upon its subject. The subscriptions, advertisements and what profit resulted upon the undertaking went entirely into the pockets of the printers, who, on my suggestion, undertook the outlay for printing and paper. I received no consideration whatever for my work. The Buffalo Society had nothing, in any shape or manner, to do with the matter. My name is upon the title page and not that of the Society, nor can I find that the Society's name has been ever previously brought forward in connection with my little venture. I am entirely at a loss to account for Dr. Riley's statement, which misrepresents my entomological labours in this particular.

Mailed February 4th.

LIBRARY, OF SCIENCES.

The Canadian Entomologist.

VOL. XXV. LONDON, MARCH, 1893. No. 3.

CANADIAN HYMENOPTERA.—No. 3.

BY W. HAGUE HARRINGTON, OTTAWA.

In my last paper (see page 32) I unfortunately repeated the error made by Provancher in giving Vancouver as the habitat of *Ecthrus Provancheri*. I overlooked its correction (CAN. ENT., Vol. XVII, page 160) by Mr. Brodie, who obtained the insect from Muskoka.

Having recently restudied and rearranged my Ottawa collections of Phyllophaga and Xylophaga, so as to prepare for publication in the *Ottawa Naturalist* a complete list of the local species, I have made some notes which may be of more general interest. There are also several species, apparently new, which I prefer to describe here, as I think that all new species should be described (or at least redescribed) in some publication devoted entirely to Entomology, and accessible to all students. The publication of species in miscellaneous proceedings and transactions prevents many entomologists from having access to them, necessitates an outlay of money and time which in many cases cannot be spared by students, and gives rise to much unnecessary synonymy, etc.

One point of interest in the Tenthredinidæ is the excess of the females, both as regards species and individuals. Of the 152 species which have been taken in this neighborhood the females of 139 species are represented, and the males of 82 only. Both sexes are recognized in 69 species, leaving 70 represented by the female only, and 13 by the male only. This disparity of the sexes is more marked in some sections of the subfamily, notably in the unwieldy and difficult genus Nematus, where of 34 species there occur females of 32, and males of only 10., *i. e.*, only the male of every third species has been found.

The scarcity of males among sawflies is even more marked, when the occurrence of individuals is considered; for in 1,262 specimens there are 885 females and 377 males. Of many species the females and males differ so much in coloration that they have been described as distinct insects, and the relationship of some have undoubtedly not yet been recognized, but there are other species of which, while the sexes are

known and readily distinguished, it is very difficult to obtain the males either by collecting in the field or by breeding. Of such may be instanced *Nematus Erichsonii*, Hart. (= *N. cinctus*, Newm, according to Kirby), of which I have only obtained one male, although the females can be taken in any desired number.

Acordulecera saginata, Prov., is apparently the male of *A. dorsalis*, Say., a species which is found upon oak and hickory, the larvæ skeletonizing the leaves.

NEMATUS RUFOCINCTUS, n. sp. Female—Length, 8 mm. Black, with pale legs and rufous band on abdomen. Head rather small; the ocelli in shallow basins defined anteriorly by a distinct sinuate ridge above the antennæ; edge of clypeus, labrum and palpi whitish; antennæ slender, with subequal joints. Thorax polished; tegulæ, angles of prothorax and legs in great part, white; the anterior and median femora touched with brown; posterior legs with apical two-thirds of femora, apical half of tibiæ and the tarsi, black; wings large, hyaline; nervures and stigma black; third submarginal cell quadrate, small, hardly larger than first; the recurrent nervures received about one-fourth respectively from the base and tip of the second submarginal cell. Abdomen robust, with dorsal ridge; basal plates, sides of first segment, spots on fifth, and the terminal segments black, remainder rufous.

One female taken near Hull on 26th June, 1887, upon alder, and in general appearance resembling a small *N. Erichsonii*, Hart.

NEMATUS THORACICUS, n. sp. Female—Length, 6 mm. Head, metathorax and base of abdomen black, remainder rufo-testaceous. Head as wide as thorax, ridges surrounding ocelli ill-defined, but prominent between antennæ; palpi and mandibles pale, the latter with red tips; antennæ long and slender, joints subequal. Thorax rufous, except sutures below wings and the scutellar region, including the scutellum, black; legs rufous, the posterior with tips of tibiæ and the tarsi almost black; wings hyaline, nervures and stigma brownish, third submarginal cell one and one-half times as long as wide; recurrent nervures received respectively about one-fifth from base and one-sixth from apex of second submarginal cell. Abdomen short and stout, slightly ridged dorsally; basal plates and spot on first and second segments black, remainder rufous.

One female taken near the city on May 11th. This species is near *N. bivittatus*, Nort., but the head is much less rugose, and the mesothorax is not lineate with black, etc.

NEMATUS LINEATUS, n sp. Female—Length, 7 mm. Rufo-testaceous. Head nearly white below the antennæ, and honey-yellow above, palpi dusky ; antennæ as long as head and thorax, rather stout, black ; a black spot between ocelli. Thorax orange-yellow ; tegulæ and angles of prothorax white ; a line on median lobe of mesothorax, a spot above insertion of posterior wings, the apex of scutellum and adjoining sutures, black ; legs yellow, coxæ and trochanters paler, tips of posterior tibiæ and tarsi dusky ; wings hyaline, nervures brownish, stigma pale, third submarginal cell nearly twice as long as first, recurrent nervures received about one-fourth the distance from base and tip of second submarginal cell. Abdomen broad, compressed toward apex, paler than thorax, basal plates and narrow broken dorsal line black, ovipositor prominent.

One female collected near city on May 5th.

Fenusa varipes, St. Farg. (*melanopoda*, Cam.), previously recorded by Mr. Fletcher as introduced from Europe, was observed on Aug. 26th, upon native alders in a swamp not far from the Experimental Farm, and a number of the leaves showed the characteristic blotches caused by the larvæ. The species can, therefore, be considered as naturalized.

Emphytus multicolor, Nort., (= *Strongylogaster multicolor*, Nort., = *Emphytus hullensis*, Prov.) This is one of the species in which variability in wing-venation has led to a redescription. I have the types, ♀ ♂, of *E. hullensis*, and they agree exactly with the description of *S. multicolor*. Of six specimens which I have since collected, four have four submarginals, as in *S. multicolor*, one three submarginals, as in *E. hullensis*, and the remaining one has three cells in one wing and four in the other. As the insect seems to more nearly resemble an Emphytus than a Strongylogaster or Taxonus, I have referred it to the former genus.

Harpiphorus tarsatus, Say. From a series of specimens taken upon Cornus it seems evident that *H. varianus*, Nort., and *H. versicolor*, Nort., are only varieties of this species. My specimens vary much in colour, but even the blackest show more or less trace of rufous. The insect is very active and difficult to net, as it darts to and fro among the bushes. On one occasion I heard a rustling of insect wings on a branch near the ground and found it to be caused by two males in pursuit of a female, and I netted the three at one stroke.

Monostegia maculata, Nort. I have already (Insect Life, Vol. II., p. 227) discussed the variation in the wing-venation of our common Strawberry Sawfly, and a further examination of the species seems to indicate

that it should be placed in the genus Monostegia. It is certainly very unlike the other species of Harpiphorus. Under the name *M. ignota*, Nort., I propose to retain a few immaculate specimens which also slightly differ in other respects.

MACROPHYA ALBILABRIS, n. sp. Male—Length, 8 mm. Black; anterior legs and base of posterior pale. Head rugosely punctured, almost opaque, no depressions or sutures above antennæ; clypeus deeply emarginate, labrum truncate; both, with spot on mandibles, white; antennæ stout. Thorax coarsely punctured, the scutellum rugose; edge of tegulæ and fine line on border of prothorax white; anterior and median legs pale, including portion of coxæ, the femora and tibiæ with dusky abbreviated lines above; tips of posterior coxæ, the trochanters, basal third of femora with line below to apex, white; remainder of femora, the tibiæ and tarsi, black. Edges of basal plates white dorsally.

One male taken near the city, but not dated. This insect is closely allied to *M. flavicoxæ*, Nort., and may prove but a variety of that species, though none of my examples of *flavicoxæ* show any variation of this kind. The chief differences are in the colour of the posterior legs, the white touches on basal plates, and the more deeply emarginate clypeus.

Pachyprotasis omega, Nort.—The insect described by Provancher (CAN. ENT., Vol. XVII., p. 50.) as *Synairema americana*, seems, from his description, to be identical with this species, except that he gives the length as .46 inch, whereas my largest specimen of *omega* is only about .35 inch. Norton in his description of the species gives the length as .26 inch.

Pachyprotasis delta, Prov. Since my notes on this species (CAN. ENT., Vol. XVIII., p. 32) I sent to Mr. Kirby a small lot of Tenthredinidæ regarding which he writes: "The principal remark I have to make on this lot of insects is, that the insect sent as *Tenthredo* (?) *delta*, Prov., is a true Pachyprotasis, near *P. discolor*, Klug., an European species."

Pachyprotasis varipicta, Har. On June 7th, I captured two males which evidently belong to the species which I described as a Harpiphorus (CAN. ENT., Vol. XXI., p. 96), and these show that the species belongs to *Pachyprotasis*, and has, like *P. delta*, very unstable wing venation. One specimen has, like the female described, two cross nervures in the lanceolate cell of one wing. The other has in the right anterior wing *five* submarginals, the third cell being subdivided almost in continuation of the second recurrent. These males differ from the female only in having the

apical two-thirds of posterior femora blackish, and the basal segment of abdomen darker at the base. The outer cells of the posterior wings are closed, as in *P. delta*.

Strongylogaster soriculatus, Prov. *S. soriculatipes*, Prov., appears to have been the name under which this species was first published, but the Abbé has used *soriculatus* in republishing, and the old name does not appear in his index.

Tenthredo grandis, Nort. This species is somewhat variable in the extent of its white markings, and I have one specimen which answers exactly to the *T. nigricollis*, Kirby, described from Newfoundland.

Tenthredo basillaris, Prov. This species is placed in Cresson's catalogue as a synonym of *T. signata*, Nort. My specimens, five females, of which one was determined by Provancher, are remarkably uniform in their markings, and do not agree with the description of *T. signata*, so that I am disposed to retain the species as distinct.

Tenthredopsis Evansii, Har. I have a female of this species from the Rocky Mts. near Calgary, and have examined another from Colorado (Gillette.) This insect is very near, perhaps identical with, *Tenthredo viridescens*, Fourcr. (*scalaris*, Klug.) an European species.

Tenthredopsis (?) annulicornis, n. sp. Female—Length, 10 mm. Head black, rugosely punctured; mandibles, clypeus and triangular spot above rufous, the clypeus strongly notched; antennæ slender, two basal joints and base of third rufous, apex of third, the fourth and terminal three black, joints five and six pure white. Thorax with the pleura coarsely punctured; rufous above with spot on each lateral lobe of mesothorax and the scutellar sutures black; legs rufous, tips of coxæ, the trochanters and posterior tarsi white, tip of posterior femora and of tibiæ black; wings hyaline, nervures blackish, base of stigma white; lanceolate cell with straight, short, cross nervures, as in Tenthredo, etc.; posterior wings without middle cells. Abdomen rufous.

Male.—Length, 9 mm. Antennæ a little stouter, testaceous, rufous toward base. Abdomen with apex blackish.

The female was taken near the city on June 6th, 1891, and the male on May 28th last. The antennæ of the male differ in colour, and in being slightly stouter, from those of the female, but in all other respects it seems to be identical. The strongly notched clypeus, and the absence of middle cells in the posterior wings, would seem to refer the female to Perineura, but the outer cells of posterior wings of the male are not

closed. These insects, except for the antennæ, look very much like small specimens of *Harpiphorus varianus*.

Pamphilius ruficeps, n. sp. Female—Length, 15 mm. Black, with rufo-testaceous head and legs. Head very large; coarsely punctured, rufous, with a small black spot enclosing the ocelli; mandibles very large; antennæ slender, about 35-jointed, black, with three basal joints rufous, third joint more than twice as long as the fourth. Thorax coarsely punctured, the pleura quite rugosely; tegulæ, anterior angles, lateral lobes and apex of median lobe of mesothorax and scutellum, rufous; beneath black, with dull rufous spots on pleura; legs rufous, coxæ paler, tarsi dusky, the posterior almost black, anterior tibiæ with side spur. Abdomen broad, with narrow lateral margin of bright lemon-yellow.

One female, found walking on a doorstep in the city, May 31st, 1891. This species is near *P. (Lyda) brunniceps*, Cress.

Pamphilius cinctus, n. sp. Female—Length, 11 mm. Black, with red band on abdomen. Head polished behind the ocelli, rugulose anteriorly; face flat with a ridge between antennæ, not reaching anterior margin of clypeus; clypeus broad, squarely truncate, not margined, and coarsely punctured; cheeks below the eyes, mandibles, clypeus, triangular spot at inner summit of each eye, similar spots behind on margin of occiput, and two minute dots below ocelli, white; antennæ black, long, slender, 25-jointed, third joint hardly longer than fourth. Thorax polished; tegulæ, short lines in front and beneath, a double triangular spot on middle lobe of mesothorax, scutellum and postscutellum, white; legs pale yellow, including tips of coxæ, anterior tibiæ without side spur; wings hyaline with brown nervures, third submarginal cell large. Abdomen with first segment, except a black spot on each side, and three following, rufous; apical segments black.

One female, taken near the city on June 28th. It resembles in appearance *P. rufofasciata*, Nort., but differs in shape of antennæ and clypeus and in markings.

Pamphilius fascipennis, Cress. This fine species, originally described from the White Mts., N.H., has been taken by Mr. Evans at Sudbury.

Xyela minor, Nort. In June, 1886, I captured by sweeping on the margins of a wood composed of pines, spruces, etc., a male and a female of this very interesting species, which Mr. Kirby thinks should constitute a distinct genus from the European species of Xyela. I failed to obtain the insect again until May 11th, 1891, when, in beating spruce trees, I

secured eight females. I endeavored to ascertain if the insects were ovipositing in the twigs, but they are so small and inconspicuous that it was impossible to find them without beating them from the trees. Subsequent beatings in the same locality, and careful search again last May failed to turn up any more. It seems probable, however, that the insect breeds in the young shoots of the spruce (as none could be found on adjoining trees or shrubs of other species), and some of our collectors, knowing when and where to search, may succeed in discovering if such be the case. It may also live in other conifers, as Provancher records taking the female on the buds of white pine, on which I have also taken one specimen.

Xiphydria canadensis, Prov.? In an article on *X. albicornis* ("A new foe to the maple." Rep. Ent. Soc., Ont., 1883, p. 40), I stated that some of the males had the antennæ black, as in *X. Provancheri*, Cress., and that this species and *X. canadensis* were probably only varieties of *X. albicornis*, with which may be also included probably *X. maculata*, Say. In re-studying my specimens I find a female which seems to be distinct, but which, however, does not agree with descriptions of any of the species quoted above as regards markings, although it agrees with *X. canadensis* in having the "head rugose except upon the vertex," and not wishing to create an unnecessary new name I have placed it under that. It has the following characteristics which are not given in the other descriptions:—Antennæ black, 16-jointed only, the second joint much shorter than in *albicornis*, not more than half as long as the third; no white markings above the antennæ on the front, but an almost square patch below and a small spot on each side of clypeus, adjoining a larger spot under the eye. There is also a small spot on the posterior margin of the head behind each eye, and two short lines above ocelli which are differently situated from those of *albicornis*. In that species the lines start about on a level with ocelli and stop before attaining the occipital margin, while in the specimen under consideration they start from the occipital margin and stop at some distance above ocelli. The coxæ are also uniformly rufous instead of black, or blackish, and the markings of thorax are different. The usual white spots occur on segments one to seven of abdomen, with the exception of the sixth.

Xiphydria rufiventris, Cress. This addition to the Canadian fauna has been made by Mr. Fletcher, who has a fine female example taken last year.

Tremex columba, Linn. In July, 1891, Mr. John Stewart, of this city, informed me that he had a stick of firewood containing a great many larvæ of beetles. Some days later I called on him to examine it and found that the insects had commenced to emerge, and that they were the common Horntail. The log was gnarlly rock-maple, about 10 inches in diameter, partly decayed, but still very hard, as was proved in sawing out a section, which I took home. I secured a number of larvæ and pupæ, and from the section retained numerous flies emerged, of which only one was a male. On leaving for Japan (July 22nd) I locked the block up in an old cabinet, and on my return found that several more females had appeared, and of course died during my absence. The fact of most interest concerning these is that one had endeavored to deposit in the block, and had died with the ovipositor deeply inserted.

NEW CHERNETIDÆ FROM THE UNITED STATES.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Since my last article on this group (CAN. ENT., Aug., 1891), I have obtained quite a number of forms; some of the new ones are described in this article. Two genera, new to the U. S., are recorded, both of which occur in South America. *Chelifer alius*, described by Leidy in Proc. Phil. Acad. Sci., 1877, agrees, as far as description goes, with *Chelanops oblongus*, Say, and with no other form known to me, therefore I consider it a synonym of *C. oblongus*.

CHELANOPS PALLIPES, n. sp.

Length, 3 mm. Colour: cephalothorax, dark brown; palpi, red-brown; dorsal scutæ, yellow-brown; legs, yellow-brown. General appearance of *C. acuminatus*, but the hand is not black as in that species. Structure also similar to *C. acuminatus*, differs in being furnished with clavate hairs; the trochanter does not project as much behind; the femur is more slender; the tibia is not nearly as much gibbose on the inner side; the hand less broad and shorter; the fingers much more slender, about as long as the hand.

California. A few specimens.

CHELANOPS LATUS, n. sp.

Length, 3.2 mm. Cephalothorax and palpi red-brown, the fingers black, scutæ red-brown, legs brownish-yellow. Structure similar to *C.*

acuminatus; hairs simple, the trochanter is less gibbose behind, the femur a little more slender; the tibia enlarges quite suddenly on the internal margin, but is then more parallel with the external margin than in either *C. acuminatus* or *C. pallipes;* the hand is more slender than in *C. acuminatus*, and the sides are quite nearly parallel; the fingers stout and much shorter than the hand.

East Florida. Under bark of pine trees. Common.

CHELANOPS GROSSUS, n. sp.

Length, ♀, 4.7 mm.; ♂, 3.3 mm. Similar to *C. oblongus*, Say, but very much larger. Palpi uniform dark red-brown; anterior part of cephalothorax similar but paler, beyond the suture yellowish; dorsal scutæ, yellow-brown; legs, pale. Body very long and narrow; cephalothorax shining, smooth; palpi with long simple hairs. Palpi similar to *C. oblongus;* hand longer and the sides more parallel; the tibia not so much swollen on the inner side and thus more slender.

Colorado. [Dr. C. F. Baker.] Apparently common.

OLPIUM OBSCURUM, n. sp.

Length, 2 mm. Colour in life blackish, in alcohol the cephalothorax and abdomen greenish with sides blackish, legs pale with a greenish tinge, palpi brownish-yellow with a tinge of green, hands darkest. Cephalothorax narrower in front than behind, anterior eyes about their diameter from anterior margin, posterior eyes just behind anterior ones and looking more dorsal; stylet simple; abdomen widest at about seventh segment, quite long; palpi shorter than abdomen; trochanters somewhat conical, sides convex; femur not quite as long as cephalothorax is broad at posterior margin, barely pedicellate; sides almost parallel, internal margin a little convex near base, then a little concave, external margin almost straight; tibia short, pedicellate, a little shorter than femur and broader than that joint, both sides convex; hand about as long as tibia, barely pedicellate, sides but little convex; fingers a little shorter than hand and curved.

East Florida. One specimen, swept from grass.

RONCUS, Koch.

Allied to *Chthonius*, differs in having but one eye on each side of cephalothorax. Not previously known from U. S.

RONCUS PACIFICUS, n. sp.

Length, 1.6 mm. Colour, pale whitish; mandibles and claws of palpi reddish; femora of palpi sometimes reddish; dorsal scutæ of abdomen yellowish-brown; legs with a pinkish tinge; young specimens lighter than adult ones. Mandibles large, as in *Chthonius;* cephalothorax somewhat narrower behind than in front, sides slightly curved, one large eye each side near anterior margin; palpi not as long as body; hand with fingers almost as long as cephalothorax plus mandibles; femur about as long as cephalothorax, sides about parallel; tibia almost conical, almost as wide at tip as the hand at base; hand not pedicellate, longer than tibia, sides but little convex: fingers longer than hand, about straight; legs short, hind pairs not much enlarged. Body and appendages with simple hairs.

Washington State. [Kincaid.] A few specimens.

IDEORONCUS, Balzan.

Allied to *Obisium*, but has only one eye each side of cephalothorax and the claw of mandible has a prominent stylet. Species previously known from South America.

IDEORONCUS OBSCURUS, n. sp.

Length, 3.2 mm. Colour, pale whitish; anterior part of cephalothorax with a reddish tinge, mandibles pinkish, palpi red, dorsal scutæ pale yellowish; body soft. The mandibles have a long stylet, which is divided into two parts; the cephalothorax is a little narrower in front than behind; the eyes, hardly perceptible above, are two, one each side, about its diameter from anterior margin; the cephalothorax just in front of eyes is more suddenly narrowed than elsewhere. Palpi shorter than body; trochanters almost twice as long as wide, the internal margin about straight, external margin quite suddenly but not greatly swollen; femur not quite as long as cephalothorax and broader than trochanters, pedicellate, internal margin at first convex then concave, external margin convex, slightly narrower near tip than near base; tibia shorter, pedicellate, external margin evenly convex, internal one convex, more so near base than near tip; hand as long as tibia, short pedicellate, much broader than other joints, neither margin much convex; fingers shorter than hand, slightly curved, stout. Body and appendages with simple hairs. Abdomen long, sides nearly parallel, not much broader than cephalothorax. The outlines of trochanters can be distinctly seen on the femora

of all legs. The tarsi are divided into two parts by a transverse suture ; posterior pairs of legs but little larger than the anterior pairs.

Washington State. [Kincaid.] Two specimens.

CHTHONIUS SPINOSUS, n. sp.

Length, 1.7 mm. Colour, hard parts pale tinged with reddish-brown, venter of abdomen white ; abdomen with a few silvery white spots. Anterior part of cephalothorax a little wider than posterior, the anterior portion bent downward and divided in the middle by a deep furrow, the mandibles bent downward ; the cephalothorax, basal joints of mandibles, and segments of abdomen provided with scattered conical tubercles which bear a spine at tip. Cephalothorax and palpi finely granulated, basal joint of palpus [trochanter] short, not visible from above ; femur about length of cephalothorax, sides nearly straight, tip a little larger than base, patella short, almost conical ; hand once and a-half as long as patella, sides nearly straight but little swollen, the inner side the most so ; fingers straight, longer than hand. Eyes a little more than their diameters apart. Abdomen twice as long as cephalothorax. Anterior legs long and slender ; posterior pairs larger but hardly longer ; trochanters distinct on posterior pairs.

Citrus Co., Florida. [C. M. Weed.] Quite common.

DESCRIPTIONS OF NEW BRACONIDS BRED BY PROF. A. D. HOPKINS.

BY WILLIAM H. ASHMEAD, WASHINGTON, D. C.

In the following pages I describe the new Braconids bred by Prof. A. D. Hopkins, of the West Virginia Agricultural Experiment Station, as recorded by him in Insect Life, Vol. IV., pages 256 to 259.

The types are in the National Museum.

Subfamily BRACONIDÆ.

BRACON, Fabr.

(1) *B. lixi*, sp. n. Bracon lixi, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 3.5 mm. ; ovipositor, 1 mm. Brownish-yellow ; stemmaticum, metathorax above, first abdominal segment and an oblong median spot on second segment at base, black ; sometimes the middle lobe of meso-scutum is black anteriorly ; antennæ 35-jointed, brown. Head and thorax smooth, shining, the head transverse. Wings hyaline ; tegulæ yellow ; costa, stigma and nervures dark brown ; recurrent nervure

received in the apical angle of the first submarginal cell; second abscissa of radius twice as long as first; second submarginal cell twice as wide at base as at apex. Legs pale brownish-yellow, the apex of posterior tibiæ above and the basal 3 or 4 joints of tarsi more or less dusky. Abdomen oblong-oval, the first segment above and the black median spot on the second, rugulose; rest of the surface granulated or shagreened; the first segment is the longest; the second and third about equal, the suture between being distinct, crenated; the following subequal, the fourth being one-third shorter than the third.

Hab.—Morgantown, W. Va.

Bred from *Lixus scrobicollis*, living in *Ambrosia trifida*.

(2) *B. rufomarginatus*, sp. n.

♀—Length, 2 mm.; ovipositor, 0.5 mm. Polished black; orbits, a line extending from base of eye and along the clypeus, yellow; palpi black; legs black, beneath pale brownish; lateral margins of the abdomen and the venter reddish-yellow; antennæ 24-jointed, black; wings fuliginous; the second abscissa of radius one-half longer than the first; the second submarginal cell not narrowed at apex.

Hab.—Morgantown, W. Va.

Comes nearest to *B. phycidis Riley*, but with darker wings and different coloured legs.

Subfamily EXOTHECINÆ.

RHYSIPOLIS, Forster.

(3) *? R. biformis*, sp. n. Rhysipolis biformis, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 3.5 mm.; ovipositor a little longer than the abdomen. Head and thorax black, pubescent; abdomen ferruginous; anterior coxæ, all trochanters, except slightly on the upper surface, annulus at base of all tibiæ and all tarsi, honey-yellow or pale ferruginous; middle and anterior coxæ and all femora black; mesopleura reddish or piceous. Head quadrate, above smooth, polished, with a delicate occipital margin; face finely punctate with a sparse, rather long, whitish pubescence; mandibles black; palpi piceous. Thorax finely shagreened, the parapsidal furrows obsolete posteriorly but sharply defined anteriorly, the middle lobe just in front of scutellum depressed, rugulose with a slight median keel; meso-pleura smooth and pale or piceous at the middle, with a slight longitudinal sulcus; scutellum smooth, with a crenate furrow across the base; meta-thorax rugose, with a delicate median carina down the centre

slightly forked at apex. Wings subfuliginous, the stigma and venation brown ; submedian cell longer than the median, the recurrent nervure not interstitial but joining the first submarginal cell at the lower apical angle ; first abscissa of radius about half the length of the second. Abdomen ferruginous or reddish-yellow, the first and second segments rugose or shagreened, the following smooth, polished. In one specimen the basal part of the third segment, as well as the first two, is also shagreened.

In the ♂ the apical margins of the third and following abdominal segments are piceous ; the antennæ are much longer than the body, brown-black, 36-jointed ; the legs similar to the female, but with the femora more piceous, not black ; otherwise as in female.

Hab.—Morgantown, W. Va.

Bred Sept. 14, 1891, from a Buprestid, or Longicorn, larva living under bark of dead Spruce *Abies nigra*.

I am doubtful about the position of this insect, as it might just as well be placed in the genus *Doryctes* as in *Rhysipolis*, having a close resemblance to *Doryctes radiatus* Cr., *D. macilentus* Prov., *D. fartus* Prov., and other species in this genus.

Subfamily Rhyssalinæ.

Rhyssalus, Haliday.

(4) *R. pityophthori*, sp. n. Rhyssalus pityophthori, Ashm., MS., Ins. Life, IV., p. 257.

♀—Length, 1.2 mm.; ovipositor shorter than the abdomen. Black, shining ; head transverse, smooth, impunctured ; mandibles and palpi pale ferruginous ; antennæ very little longer than the body, (?) 17-jointed. Thorax alutaceous, the parapsidal furrows distinct, the middle lobe with a median impressed line anteriorly. Wings hyaline, strongly iridescent, the stigma and nervures brown, the first abscissa of radius two-thirds the length of the second, the marginal cell long, extending to tip of wing. Legs, including coxæ, pale or honey-yellow. Abdomen oblong-oval, ferruginous, the ovipositor black.

Hab.—Morgantown, W. Va.

Bred July 29, 1891, from Yellow Pine twigs infested with *Pityophthorus*, sp.

Subfamily SPATHIINÆ.

SPATHIUS, Nees.

The following table will aid in determining the species in this genus known to me as occurring in our fauna :—

TABLE OF SPECIES.

Wings fuscous or blackish, with 3 white transverse bands (*i. e.*, one white band with the base and apex of wing white).....3

Wings fuscous, with one white band.....2

Wings hyaline or subhyaline, without bands.

Testaceous ; pleura, metathorax and petiole blackish or fuscous.

Petiole very long and slender, two-thirds the length of the thorax ; legs entirely pale yellow ; antennæ 24-jointed. (♂, length, 2.5 to 3 mm.) ....*S. longipetiolatus*, sp. n.

Testaceous ; abdomen from apex of second segment black.

Petiole not more than half the length of thorax ; legs pale yellow ; antennæ 24-jointed. (♂, length, 2.1 mm.).....
.....*S. californicus*, sp. n.

Black ; face, collar, mesopectus, legs, petiole and basal half of second abdominal segment, testaceous.

Petiole a little longer than half the length of thorax ; hind femora subfuscous. Antennæ 23-jointed. (♂, length, 2 mm.)
.....*S. claripennis*, sp. n.

2. Black ; head, apex of petiole, base of second segment, fuscous or piceous ; all femora much swollen ; trochanters, annulus at base of tibiæ and the tarsi, white; ovipositor twice the length of abdomen. Antennæ 34-jointed. (♀, length, 4 to 4.5 mm.)..*S. unifasciatus*,sp.n.

3. Species for the most part testaceous or brownish-yellow.....4

Species black or dark fuscous.

Collar, petiole and base of second segment, pale brownish-yellow ; trochanters, base of tibiæ and the tarsi, yellowish-white ; sometimes the mesopectus and head more or less rufo-testaceous ; basal half of second abdominal segment always finely sculptured or shagreened; ovipositor 1½ to 2 times as long as the abdomen.

♀, antennæ 32 to 35-jointed ; ♂, antennæ 25-jointed. (Length, from 2 to 4.5 mm.).....*S. simillimus*, sp n.

Ovipositor not longer than the abdomen.

Head polished, with traces of faint transverse striæ before the ocelli but none behind; second abdominal segment faintly granulated at base.

♀, antennæ 29-30; ♂, 26-jointed. (Length, 2 to 2.5 mm.).....*S. tomici*, sp. n.

Ovipositor half the length of abdomen.

Head transversely rugulose; second abdominal segment perfectly smooth, polished.

♀, antennæ broken. (Length, 3 mm.).....
.....*S. brachyurus*, sp. n.

4. Rust brown, disk of thorax and scutellum black.

Ovipositor nearly twice the length of the whole insect.

Head polished, although faintly transversely aciculated; abdomen elongate, black, shining, the petiole finely rugose, not longitudinally striated; the second segment with some faint aciculations only at base.

♀, antennæ 20-jointed, reaching only to the base of the metathorax. (Length 3.5 to 4 mm.).....
.....*S. Laflammei*, Prov.

Ovipositor not quite as long as the whole insect.

Head opaque, finely rugose, the rugæ posteriorly transverse; abdomen oblong-oval, the apical one-third of the second segment and following segments black polished; petiole coarsely longitudinally striated; basal half of second segment shagreened.

♀, antennæ multiarticulate (broken at tips). (Length, 5.5 mm.).....*S. floridanus*, sp. n.

Brownish-yellow or testaceous, sometimes varied with fuscous.

Ovipositor shorter than the body, usually shorter than the abdomen.

Head finely rugose and transversely aciculated; second abdominal segment basally feebly shagreened; ovipositor longer than the abdomen. (Length, 4.5 to 5 mm.).....*S. trifasciatus*, Riley.

Ovipositor shorter than abdomen.

Head polished without or with very faint transverse aciculations; base of second segment and the petiole yellow,

rest of abdomen black, the basal half of the second segment very finely shagreened. Antennæ 23-jointed, a little longer than the body. (♀, length, 2.8 mm.).. .....*S. Canadensis*, Ashm.

Head shining, transversely striated; basal two-thirds of second segment finely shagreened, the rest of abdomen smooth, polished. Antennæ 30-jointed, longer than the body. (♀, length, 3.5 mm.).....*S. pallidus*, sp. n.

Head opaque, minutely transversely rugulose; the second segment has the basal one-third finely shagreened, then followed by a smooth polished space and again shagreened, and polished again at apex. Antennæ longer than the body, more than 33-jointed (the tips broken off). (♀, length, 4 mm.).....*S. brunneus*, Ashm.

Head smooth polished, with scarcely a trace of any transverse aciculations; second segment polished, impunctured. Antennæ 25-jointed. (♀, length, 3 mm.)..... .....*S. sequoiæ*, Ashm.

(5) *S. claripennis*, sp. n. Spathius clavipennis, Ashm., MS. (err. impr.), Ins. Life, IV., p. 257.

♂.—Length, 2 mm. Black; prothorax, mesopectus, petiole and basal half of second abdominal segment, testaceous or yellow; legs pale, the posterior femora and their tibiæ toward apex slightly dusky. Wings hyaline, the stigma and nervures brown. Antennæ 23-jointed, fuscous, the basal three or four joints pale yellowish. The head is polished, with some faint transverse aciculations on the vertex. Thorax subopaque, finely granulated or shagreened; the petiole longitudinally striate.

Hab.—Morgantown, W. Va.

Bred April 20, 1892, from *Polygraphus rufipennis* living under the bark of dead *Abies nigra*.

(6) *S. unifasciatus*, sp. n. Spathius unifasciatus, Ashm., MS., Ins. Life, IV., p. 258.

♀.—Length, 4 to 4.5 mm. Black; collar anteriorly dull ferruginous; apex of petiole and base of second segment reddish piceous; legs fuscous, anterior and middle coxæ and trochanters, posterior trochanters and annulus at base of all tibiæ, white; tarsi more or less pallid beneath. Antennæ 34-jointed, fuscous, the basal 3 or 4 joints pallid. The head is polished, the vertex faintly transversely aciculated, the frons and

face rougher; thorax closely granulated, opaque, the middle lobe posteriorly, pleura and metathorax, finely rugulose, the latter indistinctly areolated. Wings fuliginous, with a white band across the middle from the base of the stigma, the apex of the wing showing scarcely any white. All the femora are very much swollen, while the abdomen, except the petiole, is smooth, polished; petiole longitudinally striate, somewhat rugose basally.

Hab.—Morgantown, W. Va.

Bred April 29, 1892, from *Scolytus 4-spinosus* living under the bark of *Carya alba.*

(7) *S. simillimus*, sp. n.

♂, ♀.—Length, 2 to 4.5 mm. Black; collar, mesopectus and petiole pale ferruginous or brownish-yellow. Head above transversely aciculated; thorax opaque, closely granulated; the middle mesothoracic lobe posteriorly and the metathorax finely rugose, the latter faintly areolated; petiole striate. Wings fuscous, white at base and tips, and with a transverse white band from the base of stigma. Antennæ ♀ 32 to 35-jointed, in ♂ 25-jointed, fuscous, pale toward base. Legs fuscous; the coxæ and trochanters, annulus at base of tibiæ and the tarsi, white. Abdomen, except petiole and base of second segment, black, the basal half of the second segment shagreened; ovipositor as long or very little shorter than the body.

Hab.—Morgantown, W. Va.

Bred May 18 and 25, 1892, from *Agrilus bilineatus* living in White Oak stump.

(8) *S. brachyurus*, sp. n. Spathius brevicaudus, Ashm., MS. (Olim. preoc.), Ins. Life, IV., p. 258.

♀.—Length, 3 mm.; ovipositor half the length of abdomen. Much like *S. simillimus*, but with the lower part of head, the prothorax, metathorax and petiole brownish, the ovipositor very much shorter, in *simillimus* being about as long as the whole insect, while in *brachyurus* it is only half the length of the abdomen. The head is transversely rugulose; the legs and antennæ brown, the tibiæ not annulated with white, the femora not especially thickened; while the second abdominal segment is perfectly smooth and polished.

Hab.—Morgantown, W. Va.

Bred Nov. 10, 1890, and March 15, 1891, from *Dryocoetes autographus* living under bark of dead *Abies excelsa.*

(9) *S. pallidus*, sp. n.

♀.—Length, 3.5 mm.; ovipositor a little longer than the abdomen. Pale ferruginous or honey-yellow; coxæ, trochanters, base of tibiæ and tarsi, whitish. Head shining, transversely striated; antennæ 30-jointed, longer than the body; petiole as long as the body of abdomen, striated; second abdominal segment nearly twice the length of the third, the basal two-thirds finely shagreened or coriaceous, the following segments polished, impunctured. Wings fuscous, whitish at base and tips, and with a white band across from base of stigma. The parapsidal furrows are distinct, converging and meeting at base of scutellum, the middle lobe thus formed being smooth and not rugose at base just in front of the scutellum, as in the other species.

Hab.—Morgantown, W. Va.

Bred from *Tomicus cacographus* living in Yellow Pine.

Subfamily Hecabolinæ.

Lysitermus, Förster.

(10) *L. scolyticida*, sp. n. Lysitermus scolyticida, Ashm., MS., Ins. Life, IV., p. 258.

♀.—Length, 2.1 mm. Black, shining, impunctured; mesoscutum with two distinct furrows; metathorax finely rugose; wings hyaline, nervures brown; legs honey-yellow, the posterior tibiæ and tarsi subfuscous. Antennæ 17-jointed, black, the three basal joints yellow. Abdomen oblong-ovate, composed of but three visible segments, the first segment and the second at the extreme base striated, otherwise smooth and polished; ovipositor as long as the abdomen.

Hab.—Morgantown, W. Va.

Bred April 30, 1891, from *Scolytus 4-spinosus* living under Hickory bark.

Cænophanes, Forster.

In describing the species in this genus reared by Prof. Hopkins, I have taken advantage of the opportunity to publish a table of the species known to me in our fauna, believing the characters given in the table sufficient for the recognition of all the species.

TABLE OF SPECIES.

Testaceous or brownish-yellow species.....2

Black or blackish-fuscous species.

Ovipositor longer than the whole insect.

Collar and legs yellow; abdomen piceous; first segment and basal two-thirds of second longitudinally striated, the second with a transverse impressed line at the middle.

Metathorax with two areas at base; antennæ in ♀ 24-jointed..... *C. longicaudus*, sp. n.

Metathorax rugose, but without areas at base; antennæ in ♀ 18-jointed.... *C. flavicollis*, sp. n.

Ovipositor not quite as long as the body.

Head piceous, polished; collar, mesosternum, legs and basal half of abdomen, yellow; antennæ 24-jointed; metathorax with two smooth areas at base..... *C. consimilis*, sp. n.

Ovipositor scarcely as long as the abdomen.

Head minutely punctulate, subopaque; legs, base of second abdominal segment and the three terminal segments, yellowish; first segment, basal two-thirds of second and base of third and fourth, striated; the second segment with two transverse impressed lines; antennæ 28-jointed . ..... *C. languriæ*, sp. n.

Head transversely aciculated, shining; legs brown, trochanters and tarsi yellow; abdomen piceous black, the first and second segments striated, the following smooth; antennæ in ♀ 19-, in ♂ 18-jointed..... *C. atrata*, Ashm.

Ovipositor half the length of abdomen.

Head polished, impunctured; legs yellowish-white; abdomen piceous or yellowish at base of second segment, also sometimes at apex of first; first segment, basal two-thirds of second and base of third, striated; rest of abdomen smooth, shining, the second segment with a transverse impressed line at the middle; antennæ in ♀ 23-jointed.. ..... *C. anthaxiæ*, sp. n.

Head transversely aciculated; legs brownish-yellow, the hind coxæ black; abdomen finely rugose, the first segment and the following segments (except apical portion of the 3, 4 and 5, two-thirds of the 6 and the 7, which are polished), striated; second segment with two longitudinal furrows; antennæ 25-jointed..... ..... *C. borealis*, Ashm.

Legs pale brown, trochanters and tarsi whitish; abdomen elongate ovate, black, polished, the first two segments and

the third at extreme base striated, the second segment without a transverse furrow; ♂, antennæ 22-jointed..... .....*C. pityophthori*, sp. n.

Ovipositor one-third the length of abdomen.

Head smooth, polished; collar, mesosternum, second abdominal segment and the apex of abdomen, more or less, yellow; first segment, basal two-thirds of second, and base of third and fourth, striated; the second with two transverse impressed lines; antennæ 25-jointed..... ....*C. floridanus*, sp. n.

2. Ovipositor longer than the abdomen.

Head black or piceous black, polished, impunctured; scutellum with two large foveæ at base; metathorax with two large areas at base, posteriorly rugose or reticulated; antennæ in ♀ 31-jointed.....*C. atriceps*, sp. n.

Ovipositor two-thirds the length of abdomen.

Metathorax with two areas at base.

Head transversely aciculated.

First abdominal segment and basal two-thirds of second striated; rest of abdomen smooth, polished, the second segment with a transverse impressed line; antennæ in ♂ and ♀ 25-jointed... .....*C. hylotrupidis*, sp. n.

First abdominal segment, basal two-thirds of second, and the bases of the third and fourth, striated, the second with two transverse impressed lines; antennæ in ♂ 30-, in ♀ 25-jointed..... .....*C. aciculatus*, sp. n.

Ovipositor less than half the length of the abdomen.

Metathorax with a petiolate, diamond (◊) shaped area.

Head transversely aciculated; first abdominal segment, the second, except at apex, and base of third and fourth, striated, the second with a transverse impressed line at basal one-third and a transverse depression a little beyond; antennæ in ♀ 36-jointed..*C. prodoxi*, Riley.

Metathorax rugose, reticulated, with two areas at base.

Head smooth, polished; first abdominal segment,

basal two-thirds of second, striated, the second with a transverse furrow at the middle.....
.....*C. melleus*, Riley.

Ovipositor one-third the length of abdomen.

Metathorax rugose, but not areolated; first abdominal segment and basal half of second, striated; rest of abdomen smooth, polished; antennæ in ♀ 18-, in ♂ 19-jointed....
.....*C. Koebelei*, Riley.

Metathorax with a petiolate, diamond-shaped area at the middle and with two areas at base; first, second and base of third abdominal segments striated, the rest smooth, polished; antennæ in ♀ 24-jointed, in ♂ 27 or 28-jointed.....
.....*C. Chittendenii*, sp. n.

(10) *C. languriæ*, sp. n. Caenophanes languriæ, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor scarcely as long as the abdomen. Head and thorax black, the parapsidal furrows, collar and mesopleura ferruginous, with sometimes the face and orbits ferruginous, the second abdominal segment with 2 transverse impressed lines; abdomen in ♂ pale ferruginous, in ♀ darker, with the base of second abdominal segment and the three last segments yellowish. Head minutely punctulate; antennæ in both sexes 28-jointed; wings sub-hyaline, the first and second branches of the radius equal in length; first abdominal segment, basal two-thirds of second, and base of the third, and in the ♂ the sutures at base of 3, 4 and 5, striated.

Hab.—Morgantown, W. Va.

Bred Dec. 24, 1891, and Feb. 24, 1892, from *Languria* larvæ living in pith of *Ambrosia trifida* and *artemisiæfolia*.

(11) *C. anthaxiæ*, sp. n. Caenophanes anthaxiæ, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor half the length of abdomen. Head and thorax in ♂ black, in ♀ fuscous; the head polished, impunctured; thorax closely microscopically punctate, the middle lobe posteriorly rugose; abdomen ferruginous, the first segment, basal two-thirds of the second, and the suture between segments 3 and 4, striate; legs pale yellow; wings hyaline, the first abscissa of radius two-thirds the length of the second. Abdomen sometimes fuscous, with a pale blotch at the middle.

Hab.—Morgantown, W. Va.

Bred May 4 and June 24, 1892, from *Anthaxia viridicornis* infesting Willow; and May 26, from an *Agrilus* larva living under the bark of Dogwood, *Cornus florida*.

(12) *C. pityophthori*, sp. n. Caenophanes pityophthori, Ashm. M. S., Ins. Life, IV., p. 258.

♂.—Length, 2 mm. Black; second abdominal segment at base and sometimes the petiole at apex ferruginous; head shining, faintly transversely aciculated on vertex; thorax opaque, minutely granulated; metathorax areolated, the pleura rugose; antennæ 22-jointed, black, the 3 basal joints yellow; abdomen elongate ovate, black, polished, the first two segments and the third at extreme base or the suture striated. Legs pale yellowish. Wings hyaline, the first abscissa of radius less than two-thirds the length of the second.

Hab.—Morgantown, W. Va.

Bred Feb. 24, 1892, from *Pityophthorus* sp. living under the bark of a small dying Spruce, *Abies nigra*.

(13) *C. hylotrupidis*, sp. n. Caenophanes hylotrupidis, Ashm., MS., Ins. Life, IV., p. 258.

♂, ♀.—Length, 2.5 to 3 mm.; ovipositor two-thirds the length of abdomen. Pale ferruginous; metathoracic sutures fuscous. Head above transversely aciculated; thorax finely granulated, the middle lobe posteriorly strongly rugose; metathorax, except the two basal areas, rugose, and with a A-shaped carina at the middle; first abdominal segment and basal two-thirds of the second striate, rest of abdomen smooth, polished, the second segment with a transverse impressed line at the middle. Antennæ in both sexes 25-jointed. Wings hyaline, the stigma and nervures pale brown, the first and second branches of the radius about equal in length.

Hab.—Morgantown, W. Va.

Bred April 4, 1891, from *Hylotrupes ligneus* living in *Juniperus virginiana*.

Subfamily HELCONINÆ.

HELCON, Nees.

(14) *H. occidentalis*, Cr. Helcon tetrapodii, Ashm., MS. (olim), Ins. Life, IV., p. 259.

Bred July 14, 1891, from *Tetrapodium cinnamoplerum* living in sap-wood of Spruce log *Abies nigra*.

Subfamily Alysiinæ.

Adelura, Förster.

(15) *A. tibialis*, sp. n.

♂.—Length, 1.5 mm. Polished black; lower half of head, two basal joints of antennæ, legs, including coxæ, except the posterior tibiæ which are fuscous, and first and second abdominal segments, honey-yellow. Head transverse, wider than the thorax, the ocelli close together. Palpi white. Antennæ 24-jointed, black, much longer than the body. Thorax smooth, without distinct parapsidal furrows, or only indistinctly impressed anteriorly. Mesopleura piceous; metathorax almost smooth, the surface wrinkled posteriorly. Wings large, hyaline, the tegulæ white, the costa and the elongate stigma black; rest of venation brown; the first branch of the radius very short, the second very long, about twice the length of the first transverse cubital nervure; the second submarginal cell very long, twice as broad at base as at apex; recurrent nervure almost interstitial received in the angle of the second submarginal cell; submedian cell a little longer than the median. Abdomen oblong-oval, smooth, shining, the first segment finely rugose.

Hab.—Morgantown, W. Va.

Subfamily Dacnusenæ.

Coelinius, Nees.

(16) *C. Hopkinsii*, sp. n.

♀.—Length, 4 mm. Black, shining; prothorax, legs, including coxæ, and the second abdominal segment, brownish-yellow; mandibles rufous; palpi white. Head oblong, smooth and polished; face punctate with a median carina, pubescent. Antennæ 33-jointed, black, as long as the body; the two basal joints, and the flagellum beneath for more than half its length, brownish-yellow. Thorax smooth, shining, trilobed; mesopleura separated from the mesosternum by a large longitudinal furrow and with a triangular fovea posteriorly; the surface, except anteriorly where it is sparsely punctate, is smooth and shining; metathorax rugose. Wings hyaline, the venation brown-black, the costa towards base and the tegulæ yellowish. Abdomen twice as long as the thorax, compressed beyond the second segment; except the second segment, black, smooth and shining; the first segment is one-third longer than the second, rugulose, smoother at apex.

Hab.—Morgantown, W. Va.

SYNOPSIS OF THE ASILID GENUS DIOCTRIA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table includes all the species of *Dioctria* known to me as occurring in North America:—

1. Wings on the basal half yellow, on the apical half blackish.....2
   Wings not marked like this, nearly uniformly blackish.....3
2. Legs wholly black; length, 4 mm.....*parvulus*, n. sp.
   Legs partly reddish-yellow; length, 7 mm.....*Sackenii*, Will.
3. Abdomen wholly black.....4
   Abdomen and legs partly reddish.....6
4. Legs wholly black.....5
   Legs having base of tibiæ broadly reddish-yellow; mystax black .....*nitida*, Will.
5. Mystax black.....*albius*, Walk.
   Mystax red.....*resplendens*, Lw.
6. Antennal style nearly half as long as the third joint, coxæ red .....*pusio*, O. S.
   Antennal style one-sixth as long as the third joint, coxæ black .....*rubidus*, n. sp.

DIOCTRIA PARVULUS, n. sp. ♂.

Wholly black, shining. Pile of head light yellow, that on sides of face very sparse, extending to base of antennæ. First two joints of antennæ subequal in length, the third joint as long as the first two taken together; style one-sixth as long as the third joint, thick and blunt. Pile of thorax rather abundant, that on abdomen very sparse and short, bright yellow. Base of wings to beginning of fifth posterior cell yellowish-white, beyond this blackish; all posterior and the anal cell open. Length, 4 mm. Los Angeles County, Cal. Two specimens.

DIOCTRIA RUBIDUS, n. sp. ♂.

Head black, the pile light yellow; face with a large fovea above the centre, below which is a large gibbosity bearing the rather dense mystax; face covered with a very short, brassy yellow pubescence, and with a few pile on each side above. Antennæ black, first joint one and a-fourth times as long as the second, the third joint slightly longer than the first two taken together, the style one-sixth as long as the third joint, very robust, its tip blunt. Thorax and scutellum shining black, quite thickly light yellow pilose. Abdomen shining reddish-brown, except the first segment which is black, but sometimes the second segment and a large portion of the third and fourth segments are also black; pile very sparse and short, light yellow. Legs yellowish, the coxæ, trochanters, apical three-fourths of hind tibiæ, and sometimes also of the other tibiæ, and all the tarsi, black. Wings blackish, all posterior and the anal cell open. Halteres yellow. Length, 7 mm. Los Angeles County, Cal. Three specimens.

NOTES FROM THE CORNELL INSECTARY.

I.—SOME RESULTS OF A TRAP LANTERN EXPERIMENT.

BY M. V. SLINGERLAND, CORNELL UNIVERSITY, ITHACA, N. Y.

May 1, 1889, the Entomological Department of the Cornell Agricultural Experiment Station set six trap lanterns, at considerable distances apart, on the University farm for the purpose of determining their value as an insecticide. Each trap consisted simply of a common lantern set in a pan of water whose surface had a thin film of kerosene upon it to facilitate the destruction of the insects caught. The lanterns were kept burning every night until Oct. 15, 1889, or until no more insects were attracted. The captured insects were taken from the pans every morning and placed in alcohol, those from each lantern being kept separate. So many outside influences, as other lights, the smallness of the area covered, etc., entered into the case, that practically no results were obtained from the different locations of the lanterns in the number of specimens caught by each lantern in any of the species thus far studied. Therefore, in the tables which follow, the total catch for each day from all the lanterns is placed under that date.

An immense amount of material was taken, representing nearly every order of insects; the moths, however, included a majority of the specimens. But comparatively little of the material has yet been studied. Several species of Cut Worm Moths, the Apple-tree Tent Caterpillar Moth, and all the species of the May Beetles taken in the lanterns have been determined by the writer. As all of these are of economic importance, the following tables showing the number of specimens of each species taken each day will be of economic interest as showing the period of flight, when most numerous, the relative commonness of the different species, and many other questions of importance, as we shall see.

TABLE I.—*Clisiocampa americana* taken at Trap Lanterns in 1889:—

DATE.	MALES.	FEMALES.
June 17	1	
" 18	2	
" 20	4	
" 21	3	
" 22	6	
" 25	11	4
" 26	35	
" 27	85	8
" 28	46	5
" 29	100	33
" 30	61	25

TABLE I.—*(Continued).*

DATE.	MALES.	FEMALES.
July 1	62	6
" 2	30	
" 3	29	4
" 4	26	
" 5	7	1
" 6	1	1
" 7	1	
" 8	1	1
" 9	1	
" 18	1	
Total	513	88

TABLE II.—*Agrotids* taken at Trap Lanterns in 1889 :—

DATE.	*F. subgothica.*		*F. jaculifera.*	
	♂	♀	♂	♀
July 4				1
" 12	1			
" 17				1
" 21	2			
" 23	1			
" 26	1			
" 27	2			
" 28	1			
" 29	6			
" 30	2	2		
" 31	12	2		
Aug. 1	7	2		
" 2	19			2
" 3	9	1	1	
" 4	17	3	1	
" 5	39	4	3	
" 6	5			
" 7	3			
" 8	5		1	
" 9	32	1		
" 10	7	1	4	
" 11	9	2		
" 12	5			
" 14	30	3	1	2
" 15	59	1	2	
" 16	42		1	
" 17	76	10		2
" 18	124	3	1	
" 19	161	9	5	
" 20	198	6		
" 21	160	19	1	1
" 22	108	6		
" 23	63	2		
" 24	122	10		

TABLE II.—*(Continued).*

DATE.	*F. subgothica.*		*F. jaculifera.*	
	♂	♀	♂	♀
Aug. 25	209	8		
" 26	110	7		
" 27	90	2		
" 28	93	3		
" 29	97	4		
" 30	53	2		
" 31	108	6		
Sept. 1	60	8		
" 2	65	2	1	
" 3	50			
" 4	87	4		
" 5	23			
" 6	37	2		
" 7	8			
" 8	16	3		
" 9	1			
" 11	1	2		
" 14	1			
" 16	2	1		
" 17	1			
" 18		1		
Total	2240	142	22	9

One male of *Carneades redimicula* was taken on the 16th and a female on the 29th of July, and a female of *Carneades insignata* was caught July 11.

TABLE III.—*Lachnosterna* taken at Trap Lanterns in 1889 and 1892:—

DATE.	*fusca.*				*dubia.*				*ilicis.*			
	1889.		1892.		1889.		1892.		1889.		1892.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
May 6	1											
" 7	1											
" 8	1	1				1						
" 10					1							
" 11	1	1			2	1						
" 12					1	1						
" 13		1										
" 14	1	1			2							
" 16	1				6							
" 17	2	1			1							
" 18	8	1				2						
" 19	22				5	1						
" 20	4				4							
" 21	21				4	1						

TABLE III.—*(Continued).*

DATE.	*fusca.*				*dubia.*				*ilicis.*			
	1889.		1892.		1889.		1892.		1889.		1892.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
May 22	1	2			1							
" 25	16	2			4	3						
" 26			2		1							
" 28					1							
" 30			10	2	1			1				
" 31	1	2	8				2					
June 1	131	5			3				2			
" 2			3		2	1	1					
" 3	4	1	3		6		4					
" 4	13	1	1		2							
" 5	1	1				1						
" 6			1					1				
" 7			1				1					
" 8		1				1						
" 9	8	2			1				1			
" 10	11	3	2	1								
" 11	4	1	4									
" 13		1	12	1		1					1	
" 14	1	2	54	1				1				
" 15	6	1	13	1	1				1			
" 16	3		5						1			
" 17	3	2	11	1							3	
" 18	6		1									
" 19			1	1								
" 20	3	2	32	2							1	
" 21	1		35	2								
" 22	4	1	28	1		1	1					
" 25			2	1								
" 26	2								1			
" 27	8	1							1			
" 28	3		1	1					2			
" 29					1				1			
" 30	1								1			
July 1									5			
" 2	1								4			
" 3	1								1			
" 4									1			
" 5	1					1						
" 14											1	
" 19									1		1	
" 20									3		1	
" 28											1	
" 30									1		1	
Total	297	37	230	15	50	16	9	3	27		10	

In this table are also included the results of the specimens caught in one trap lantern which was kept running during 1892, from May 20 to Oct. 1. In 1889 there were also taken two specimens of *grandis*, June

20 and 27, both males; four *hirticula*, two males and two females, the former taken July 1 and 19, the latter June 14 and July 22; two males of *balia* taken June 1; two males of *hirsuta* taken May 20 and June 3; and one male of *quercus* was taken June 1. In 1892, one male of *grandis* was taken June 21; three males of *hirticula* on June 11, July 15 and 26; and two males of *hirsuta* were taken on June 2 and 3. Thus eight species were represented in the trap lantern material; at least twenty-three species should be found in our State.

From Table I. we learn that *Clisiocampa americana* flies from June 17 to July 18, occurring in the greatest numbers during a period of about ten days from June 26 to July 4; over 92 per cent. of the moths being taken at this time.

Table II. shows that *Feltia subgothica* is excessively abundant in this locality, nearly 2,400 specimens having been taken. I believe that more specimens of this moth were taken than of any other species of insect. Although the species flies from July 12 to Sept. 18, there is nothing to indicate more than one brood. Other experiments at the Insectary show that the insect hibernates in the larval state, and it is said that the change to a pupa takes place about July 1. As will be seen in the table, the adults appear in the greatest numbers from Aug. 14 to Sept. 6, over 97 per cent. of the moths being taken during these three weeks.

A glance at Table III. will show that *fusca* is by far the most numerous species in our vicinity; out of 694 specimens of *Lachnosterna* taken in the two years, 83 per cent. of them are *fusca*. *Dubia* and *ilicis* are comparatively common, while *hirticula*, *hirsuta*, *grandis*, *balia* and *quercus* are rare. In 1889 *fusca* flew from May 19 to June 10 and reached its climax on June 1, when 39 per cent. of them were taken. In 1892, however, *fusca* did not begin to fly until May 26 and stopped June 28, and it was the most numerous from June 13 to 28, or about two weeks later than in 1889. *Hirsuta*, *balia* and *quercus* seem to appear at about the same time as *fusca*, that is, during May and June. But *ilicis*, *grandis* and *hirticula* do not appear until the latter part of June and during July. No *Lachnosterna* were taken after July 30, although the lanterns were run until Oct. 15, thus indicating that the emergence of the beetles in the fall is very uncommon, if it happens at all. This is confirmatory evidence of the conclusion which Prof. Forbes, of Illinois, and Prof. Perkins, of Vermont, have reached in their recent

studies of these insects. In the case of the three species which fly later in the season, it is possible that they either pass the winter as pupæ or do not pupate until spring.

The most striking thing to be learned, however, from each of these tables is the great disparity in numbers between the males and females caught. The males greatly outnumber the females in every instance. Only about 17 per cent. of the *Clisiocampa americana* in Table I. were females. But a little over 6 per cent. of the *Feltia subgothica* in Table II. were females, while nearly 41 per cent. of *jaculifera* were of this sex. Less than 12 per cent. of the *Lachnosterna fusca* in Table III taken in 1889, and but little over 6 per cent. of those taken in 1892, were females; with *dubia* the proportion of females is greater, being about 32 per cent.; no females of *ilicis* were taken in either year.

This great preponderance of the males over the females has also been noticed in every other species of the trap lantern material which has been studied of whatever order. It indicates that the males are much more active than the females, and is of the greatest importance when considering the insecticidal value of the trap lantern. For undoubtedly many of the males have copulated before being caught, and enough others remain uncaptured to fertilize the remaining females. Therefore the perpetuation of the species is provided for, and the insecticidal value of the lantern is rendered too small to be practicable.

BOOK NOTICE.

THE BUTTERFLIES OF NORTH AMERICA. Third Series, Part XIII.

Another part of Mr. Edwards's magnificent work has just appeared, and for beauty of illustration and interest of the letter-press, it perhaps surpasses all previously issued parts. The first plate shows the type of *Chionobas Chryxus*, var. *Calais*, Scudder, and the accompanying letter-press gives some interesting data collected by Mr. T. E. Bean concerning a similar form found at Banff, in the Rocky Mountains. The second plate shows in full all stages of the rare Canadian species, *C. Jutta*. This is accompanied by 14 pages of letter-press, in which nearly everything that is known concerning this species in America is related in a most entertaining manner. To the Rev. T. W. Fyles, F. L. S., of South Quebec, belongs the honour of being the only person so far who has reared *Jutta* from the egg to imago and described the different stages.

What the writer deems the most interesting feature in the life of this species is referred to, but Mr. Edwards's view of the matter seems to be different from his. Speaking of larvæ which hibernate after the first or second moult of a brood, part of which reach full growth the first autumn, he says :—"If any of these small larvæ run their full course, it seems certain that their butterflies should show themselves at least a month later than the 15th of June, and I do not understand why there is not a second flight." The writer has had the opportunity four times of breeding the species from the egg through the first winter, and all of the specimens hatched from eggs laid at Ottawa, Quebec, Banff and Nepigon, went into hibernation after the first or second moult ; one larva, however, of five sent by Mr. Edwards, fed straight on and reached full growth before winter set in. Those which revived the following spring fed slowly and did not attain full growth until the autumn, as related of this species and of *Chionobas Macounii* in Annual Report Ent. Soc., Ont., 1888, p. 7.

The third plate, also, figures two rare species of the same genus, which may be included in the Canadian fauna, *Crambis*, from Labrador, and a mountain species, named *Brucei* by Mr. Edwards, which has been taken by Mr. Bean, at Banff. The preparatory stages of the latter are beautifully illustrated in great detail, and it is seen that the larva resembles very closely that of *C. Semidea*. There are some critical notes concerning the synonymy of some allied species, which will be read with interest by students of this difficult genus.

We feel sure that all entomologists will hail with pleasure the appearance of this superb contribution to the knowledge of our Diurnal Lepidoptera, and we trust that the talented and genial author may be spared for many years to carry on this great work which has cost him so much.

J. Fletcher.

[We were delighted to hear that Mr. Edwards has received a grant of $500 from the Bache Fund of the National Academy of Sciences to assist him in the completion of his publication on the Butterflies of North America.—Ed. Can. Ent.]

NOTES.

LUMINOUS WORMS.

Driving from Hudson to Como on the 23rd of September, 1892, about 8 p.m., the night being warm and damp, I was much surprised to see on the hard road something luminous, emitting quite as strong a light as the glow-worm in England. We stopped quickly, but before I could get back the few yards it had disappeared. Some half mile further we passed another, which also, before I could get to it, disappeared. Can any of your readers say what these were? Their sudden disappearance and our failing to find them, though we struck a match in both cases, would lead me to think they were some sort of earth worm, as these draw themselves quickly into their holes when disturbed. How else is their sudden disappearance to be accounted for? LACHLAN GIBB.

The cells of *Megachile*, which I send, were found in rather a peculiar place last September, being attached to the trimmings of a dress which was inside a wooden chest placed on a gallery in Montreal.

LACHLAN GIBB.

CORRESPONDENCE.

LARVOPHAGOUS CATERPILLARS.

Sir: On reading in the issue of the CANADIAN ENTOMOLOGIST for January of Larvophagous caterpillars of *P. philenor*, I was reminded of an observation which I made last summer. I had at that time several larvæ of *Danias archippus* in a wire cage, and supplied them frequently with milkweed leaves, which they devoured voraciously. On one occasion, owing to a delay in getting leaves, their supply became exhausted, and in a short time—not more than an hour or two, I should think—one of them attacked another which was about to change to a chrysalis, and began eating it. Some of the others joined, and by the time the leaves were obtained fully half of the unfortunate caterpillar had disappeared. They ate it very slowly, not being hungry enough to relish it, I suppose. My brother tells me that he has seen a larva of *P. asterias* greedily eating the chrysalis of one of its kind which was hung on a fence.

WILLIAM L. W. FIELD, Guildford, Conn.

Mailed February 28th.

The Canadian Entomologist.

VOL. XXV. LONDON, APRIL, 1893. No. 4.

SOME NEW LOCUSTIDÆ FROM INDIANA.

BY W. S. BLATCHLEY, TERRE HAUTE, INDIANA.

During the past four years the writer has been getting together a collection of *Locustidæ* from various parts of the State of Indiana, with a view of preparing a general descriptive paper of the species of that family found in the State. In working over the material thus gathered thirty-seven species are found to be represented, four of which are evidently new to science. Of the four, three belong to the genus *Orchelimum* and one to the genus *Conocephalus*. The former genus is represented in the collection by ten species and the latter by four. Below is given a description of each of the four species believed to be new, together with such notes concerning the distribution of each as I find in my field note-book.

Conocephalus, Thunberg.

Conocephalus palustris, nov. sp.

A small but comparatively heavy-bodied species, having the cone of the vertex devoid of black markings and without a basal tooth; ovipositor very short and broad; posterior femora armed beneath on both carinæ.

Cone of the vertex short and stout, the tip round, the deflexed front with a dull median carina. Pronotum short, broad, the posterior margin regularly rounded, the lateral carinæ well defined, the entire surface thickly and rather deeply punctate. Tegmina long and rather narrow, regularly rounded to the apex; of a more delicate texture than in either *C. ensiger*, Harris, or *C. robustus*, Scudder. Fore and middle femora with two short spines on the apical third of the lower outer carina. Hind legs short, the tibiæ but little more than half as long as the closed tegmina; the femora with plainly visible spines on both of the inferior carinæ, eight on the outer and six on the inner. Ovipositor a little shorter than the hind tibiæ, broadest at a point about two-thirds the distance from the base, thence tapering regularly to a sharp apex.

General colour a very bright grass green. Fastigium tipped with dull yellow, which extends half way down the sides. Labrum and apical segments of all the palpi a rose red tinged with violet. Tarsi somewhat infuscated. Antennæ and apical third of ovipositor reddish-brown.

Measurements.—Female—Length of body, 27 mm.; of fastigium in front of eye, 2.75 mm.; of pronotum, 7 mm.; of tegmina, 37 mm.; of hind femora, 20 mm.; of hind tibiæ, 19.5 mm.; of ovipositor, 19 mm.

This handsome species of *Conocephalus* belongs to the same group as *C. robustus* and *C. crepitans*, Scudder, but is smaller and of a more uniform and brighter green than either of those species, besides having shorter legs, ovipositor, etc. It is described from a single female taken October 24, from the fallen grasses on the margins of a large low-land pond in Vigo county. This pond is surrounded on all sides by heavy timber, and its margins have yielded a number of interesting Orthoptera found nowhere else in the county. Among them are *Leptysma marginicollis*, Serv., *Paroxya atlantica*, Scudder, *Anaxiphus pulicarius*, Sauss., *Phylloscirtes pulchellus*, Uhler, and *Xiphidium nigro-pleurum*, Bruner. The first four mentioned are insects of a southern range, and perhaps *C. palustris* will in time be found to be more common southward.

ORCHELIMUM, Serville.

Orchelimum indianense, nov. sp.

A slender-bodied insect, with a dark median streak down the face, and having the posterior femora unarmed beneath. The cone of the vertex is short, rather narrow, with a rounded apex. The tegmina narrow, tapering, a little shorter than the wings, and of a delicate, almost gauze-like, texture. Posterior femora slender, shorter than the closed tegmina. Anal cerci of male of medium size, longer than the subgenital plate, tapering to a dull point; the basal tooth short, with a broad base and a very sharp point. The ovipositor of female of less than average width and length, the apical half with a gentle upward curve.

Colour of dried specimens: Tegmina and wings a transparent whitish, tinged with green on the front or lower, longitudinal nerves; the cross nervules of the latter darker. Sides of pronotum and abdomen, and all the femora, light green; the tibiæ and tarsi of a brownish hue. Face yellowish-white, with a dark fuscous stripe, the width of the labrum, starting with the mouth and passing upward to the vertex, where it narrows to the width of that organ; then, broadening on the occiput, it passes back to the front border of the pronotum, where it divides into

two narrow streaks, which enclose a whitish area and extend a little beyond the posterior transverse suture, where they taper to an end. Subgenital plate of male yellow. Basal third of ovipositor dark brown, the remainder light reddish-brown.

Measurements.—Length of body, ♂, 17 mm.; ♀, 17.5 mm.; of pronotum, ♂ and ♀, 4 mm.; of tegmina, ♂, 20 mm.; ♀, 18 mm.; of hind femora, ♂, 14 mm.; ♀, 14 5 mm.; of ovipositor, 7.5 mm.

This graceful and prettily marked species was found to be quite common among the rank grasses and sedges growing about the margins of a tamarack swamp near Kewanna, Fulton county. It was first taken on August 26th and again on September 24th, when it appeared more plentiful than before. It is the smallest and most slender of the ten species of the genus so far known to occur in the State, and its markings are very distinct from those of any of the others.

Orchelimum campestre, nov. sp.

A species of less than medium size, with the wing-covers narrow and of almost equal width throughout, the posterior femora unarmed beneath, and the ovipositor short and narrow.

Cone of the vertex prominent, narrow, rounded at the apex; the sides of the frontal deflexed portion rapidly converging to form a very acute wedge. Wing-covers long, narrow, not widened in the middle as in *O. vulgare*, *concinnum*, etc., tapering slightly on the apical third to a rounded end; their length equalling that of the wings in the ♂, a little shorter in the ♀. Posterior femora with the basal half quite stout, the length less than that of the tegmina. Cerci of male slender, cylindrical, somewhat pointed, the apical half curved slightly outwards, the basal tooth short and weak. Ovipositor short, narrow, moderately upcurved, and tapering to a delicate point.

Colour.—Tegmina and wings almost uniform transparent olivaceous brown. The usual dark reddish-brown band upon the occiput and disk of pronotum is margined on the latter with two very narrow and darker brown stripes, which extend back to the middle of the posterior lobe of the pronotum. Face, and usually the hind femora, a dirty olive brown; the latter, when dry, with a blackish longitudinal band on the exterior face. In the female the only green on the body is on the lower part of the sides of the pronotum and on the anterior femora. The only male at hand has the posterior femora green, but otherwise is coloured like the females. Ovipositor light reddish-brown.

Measurements.—Length of body, ♂, 17.5 mm.; ♀, 19 mm.; of pronotum, ♂, 4.5 mm.; ♀, 5 mm.; of tegmina, ♂, 20.5 mm; ♀, 24.5 mm.; of antennæ, ♂, 46 mm.; of posterior femora, ♂, 17 mm.; ♀, 17.5 mm.; of ovipositor, 7 mm.

This dull coloured grasshopper has been found in small numbers in both Vigo and Fulton counties, in upland prairie meadows, where it frequents the tall grasses, usually in company with *Xiphidium strictum*, Scudder.

It is a smaller and more slender bodied insect than the common *O. vulgare*, Harris, and has a shorter and narrower pronotum and a much smaller ovipositor than that species.

Orchelimum Bruneri, nov. sp.

A species of about the same length, but less robust than *O. vulgare*, Harris, having the posterior femora armed beneath, and the ovipositor very broad, nearly straight and of more than average length.

Cone of the vertex narrow, moderately elevated, rounded at apex. Tegmina long and narrow, a little shorter than the wings. Posterior femora rather stout, the apex, when appressed, not quite reaching the tip of ovipositor; armed beneath on the apical half with three or four small spines. Cerci of male stout, acuminate, with the internal tooth prominent.

Ovipositor very similar to that of *O. gladiator*, Bruner, being very long and stout, nearly straight above, and with the under side of apical third sloping rapidly to the acute apex.

Colour of dried specimens.—With the exception of the ovipositor, which is a light reddish-brown, and the usual stripe on occiput and disk of pronotum, the whole body is a pale, transparent brownish-green, the green showing plainly only on the lower half of the side of pronotum and on the meso and metapleura. The reddish-brown dorsal stripe of occiput and pronotum is bordered laterally throughout its *entire* length with a very narrow one of much darker brown. When immersed in alcohol the reddish-brown stripe fades to a yellowish white, leaving the two lateral ones as prominent dark streaks, widest on the central portion of the frontal disk.

Measurements.—Length of body, ♂, 18 mm.; ♀, 20.5 mm.; of tegmina, ♂, 21 mm.; ♀, 25 mm.; of pronotum, ♂ and ♀, 4.75 mm.; of hind femora, ♂, 16.5 mm.; ♀, 18 mm.; of ovipositor, 10 mm. Described from 2 ♂s and 4 ♀s.

This species, the female of which is at once conspicuous by reason of the shape and size of its ovipositor, has been taken in small numbers only in Vigo Co., where it is found during August and September on the leaves and stems of a tall, broad-leaved knot-weed, *Polygonum amphibium*, L., which grows luxuriantly in the shallow waters about the margins of two or three large ponds in the Wabash River bottoms. Several other "green grasshoppers," notably among which are *Xiphidium attenuatum*, Scudder, and *Orchelimum nigripes*, Scudder, frequent this plant in immense numbers. Keeping company with them an occasional specimen of *O. Bruneri* is seen, but, being an active leaper, it often escapes amidst the dense foliage of the knot-weed before its capture can be effected. Its less robust body and longer armed posterior femora will readily distinguish this species from *O. gladiator*, the only other one which, to my knowledge, has an ovipositor shaped like that of *Bruneri*. The latter is named in honor of Prof. Lawrence Bruner, of Lincoln, Nebraska, one of the leading authorities on N. A. Orthoptera.

ON SOME BUTTERFLY LARVÆ NOT HITHERTO DESCRIBED.

BY HARRISON G. DYAR, BOSTON, MASS.

PHYCIODES CARLOTA, Reak.

Larva.—Head subcordate, apices slightly produced, mouth parts small; rough, tuberculate, hairy; colour black, a narrow white line above the mouth. Body robust, with short and thick conical, densely-bristly spines, arranged thus: on joint 2 one short stigmatal and one substigmatal, besides tubercles on the cervical shield; on joints 3–4, subdorsal, lateral and subventral; on 5–11, dorsal (single), suprastigmatal, substigmatal, 2 subventral; on 12, two dorsal (in line), subdorsal, superstigmatal, substigmatal and subventral (small); on joint 13, two subdorsal (in line). Cervical shield, anal plate, feet outwardly and spiracles black; body brownish-red, with a dorsal and subdorsal black shaded line, most distinct in the segmental incisures.

Pupa.—Straight on ventral side; thorax with no prominence; abdomen arched, with five rows of slight blunt points, which also occur on thorax at the angulations, but slighter. Colour grayish, dull brown mottlings on a white ground. Length, 14 mm.; width, 4 5 mm. Found on the ground feeding on an undetermined plant which was just starting, at Denver, Colorado, April 30, 1891.

THECLA GRUNUS, Boisd.

Larva.—Head testaceous, with a black shade on each side; width, 1.2 mm. Retracted beneath joint 2. Body flattened, tapering somewhat posteriorly but rounded, the segments arched. A subdorsal and subventral ridge, not very prominent. Dark or bluish-green, without white granulations, but having minute, brownish, piliferous dots, quite densely distributed. Obscure geminate dorsal, single subdorsal, stigmatal and subventral lines, pale whitish and broken, becoming later yellowish, and the subdorsal one distinct and almost continuous. The two subdorsal lines are 2.2 mm. apart. The pile on the body is longer and stiffer on the subventral ridge than elsewhere. A rounded, diamond-shaped, depressed, cervical shield situated about the centre of joint 2, on which the blackish, elevated, piliferous dots are smaller than elsewhere.

Chrysalis.—Suspended by the cremaster and a loop of silk. Short, thick, flat on the ventral side, rounded dorsally, with a very slight depression between the thorax and abdomen. Colour pale green, speckled with blackish (but faintly); a bright yellowish subdorsal line on the abdomen, faintly continued on the thorax, and a double dorsal row of yellowish dots on the abdomen.

Duration of this stage, fifteen days.

Food plant.—The young leaves of the live oak (*Quercus chrysolepis*, Liebm.). Larvæ from Yosemite, Cal.

NEW NORTH AMERICAN MICROLEPIDOPTERA.

BY PROF. C. H. FERNALD, AMHERST, MASS.

Crambus albilineellus, n. sp.

Expanse of wings, 26 mm. Head, palpi, thorax and fore wings dull ochre-yellow. The palpi are darker on the outside, and the subcostal, median and veins 5 to 10 are white. A stripe of lead-coloured scales extends from the base of the wing just above and parallel to vein 1 to the outer cross line, and a similar stripe occurs between this and the hind margin. Two lines cross the wing: The first is dark brown, and arising from a point a little before the middle of the costa forms an outward angle very near the costa and an inward angle on the subcostal vein, then a second outward angle is formed at the end of the median vein and from this point the line runs more or less distinctly across to the middle of the hind margin. The second line is dark brown but finer, dentate and edged on the outside with lead coloured scales, and runs from the costa before

the apex across to near the outer margin, thence across the wing nearly parallel with the outer margin. The space from the end of the cell to the apex is somewhat stained with brown. The terminal line is fine, black, and with a row of black dots in it. The fringe is concolourous with the adjacent part of the wing, but with slight metallic reflections. Hind wings fuscous, fringe lighter.

Described from one specimen taken in Southern California.

Crambus coloradellus, n. sp.

Expanse of wings, 22 mm. Head, palpi, thorax and fore wings, pale silvery straw colour; the palpi darker on the outside. A white stripe extends from the base of the wing through the cell to the outer margin, bifid beyond the cell. All the veins of the wing are more or less indicated by pale yellow, edged on each side with a more or less broken row of black scales. A pale yellow line crosses the wing at the end of the cell where it rounds outwardly and runs nearly straight and vertical to the hinder margin. The outer line is curved within the apex and runs straight to the hinder margin. Both of these lines are faint, and the outer one is edged on the outside with silvery scales. The terminal row of black dots is in a straight line, and does not follow the margin at the lower part where it rounds outwardly. Fringes silvery metallic. Hind wings white, slightly stained with pale fuscous on the apex.

Described from one example from Colorado.

Alucita fishii, n. sp.

Expanse of wings, 20 mm. Thorax and fore wings pure white, the latter with a few brown atoms scattered over the costal part of the wing, and more abundant before the fissure, where it almost defines itself as a triangular spot with a curved outer side reaching to the costa, and beyond which on the costa are two equidistant brown spots. Fringe pure white. Hind wings and their fringes pure white. Abdomen white, head wanting in the single specimen before me, which was taken in Nevada by the late Mr. H. K. Morrison.

I name this species for Mr. Charles Fish, of Brunswick, Me., who did such excellent work on our "feather wings" some years ago.

Alucita elliottii, n. sp.

Expanse of wings, from 23 to 25 mm. Head pale yellow (?). Thorax and fore wings pure white, the latter with a brown point before the cleft, an elongated brown spot on the costa over the base of the cleft, and a few brown atoms along the basal third of the fold. Hind wings and all the fringes pure white.

This insect was received from the late Mr. Elliott, who bred it at his home in New York, but on what plant I did not learn.

Alucita eupatorii, Fern.

In 1855, Dr. Asa Fitch, in his first report as Entomologist of New York, published the description of his *Pterophorus cretidactylus*. In 1874, Prof. P. C. Zeller, in his "Lepidoptera der Westkuste Amerika's," described what he supposed to be Fitch's *cretidactylus*, under the generic name *Œdematophorus*, and it was again referred to by Lord Walsingham in his "Pterophoridæ of California and Oregon," who sent specimens to Zeller for determination, and also kindly gave me specimens of this as well as of nearly all of the species he described.

Mr. Charles Fish took up the study of our Pterophoridæ and described several species in this journal, and later purchased the types of Dr. Fitch, when he discovered that the species that had been so well described by Prof. Zeller was not Fitch's species. Finally I purchased Mr. Fish's collection, including not only his own types but also those of Dr. Fitch. I was then able to verify the determination of Mr. Fish, and with him to discover that Lord Walsingham had redescribed the true *cretidactylus*, Fitch, under the name of *Œdematophorus occidentalis*. The *cretidactylus* of Zeller not being the true *cretidactylus* of Fitch, must have a new name, and as it has been bred from *Eupatorium purpureum* by Mr. Elliott, I have given it the specific name of *eupatorii*, as above.

Coriscium cuculipennellum, Hb.

I have received this species from Mr. M. V. Slingerland, of Cornell University, who bred it from ash at Ithaca, N.Y. This European species has not been observed in this country before, and is probably a recent importation. I am under obligations to Lord Walsingham, who compared it with the European species, and determined it specifically for me.

Mr. Slingerland also sent me what I believe to be a new species of *Carposina*, which he bred on currant. He wrote me as follows:—"The egg is laid on or within the berry, and the larva feeds upon the pulp, and sometimes the seeds, confining its work to a single berry. The fruit soon dropped, and the larva left the berry, went into the ground and there pupated. The adults appeared in the spring about the time the currants were turning red. There was only one brood during the season."

The specimens received from Mr. Slingerland were in very poor condition, and I have decided not to describe the species till better specimens are obtained.

The genus *Carposina* has been placed among the Tineids, but it should be placed near *Conchylis* among the Tortricids.

HINTS ON COLLECTING COLEOPTERA DURING THE WINTER.

BY A. FORD, ST. LEONARDS-ON-SEA, SUSSEX, ENGLAND.

During the winter the coleopterist in Britain finds a great deal to do in the way of collecting, as many species are to be met with at this season, which will probably not be found at any other period of the year. One of the principal methods of collecting during the winter is "tuft-cutting", and it is astonishing the number of beetles which pass through the winter in tufts of grass. Those growing in damp places in woods and on the borders of ponds and streams are generally the most productive. They should be cut off close to the roots, then shaken and pulled to pieces over a sheet of paper, which should be very carefully examined, otherwise many of the more minute species will be passed over. If the weather is too severe for this sort of work, the collector should provide himself with a strong canvas bag, into which the tufts can be shaken, and the contents can then be examined at home at his leisure. Moss is also very productive at this season. Vast numbers of beetles may be found hibernating in moss in sheltered situations. This should be examined in the same way as the tufts. Haystacks are also good hunting grounds for the coleopterist. The loose refuse underneath the stack is usually the best part to work. Piles of faggots and logs in woods generally repay the collector for a careful examination. Numbers of beetles are to be found at the roots of grass, especially on sandy banks, where the grass grows in patches. They are always found as close as possible to the roots, and many of them harmonize so well with the ground that it requires a very careful search to discover them. By carefully working a bank of this description one winter I obtained over one hundred species of Coleoptera, including several "rarities". I may add, the bank was only about thirty yards long by two broad. Of course, there are many species of wood-boring beetles to be found in the winter months, as also many others which occur in various species of fungi.

A diligent collector will doubtless add many species, and probably some "rarities" to his collection, if he takes the trouble to look for them during the winter months, and if the foregoing remarks prove of any service to those interested in Coleoptera, I shall be amply repaid for the trouble of writing them.

THE BUTTERFLIES OF GRAND RAPIDS, MICH.

BY ROBT. H. WOLCOTT.

Grand Rapids, Michigan, is situated in the western part of the State, thirty miles from Lake Michigan, in N. lat. 42° 58', in W. long. 85° 40', with an altitude of between 600 and 700 feet. The underlying formation, outcropping in the bed of the river, is the subcarboniferous limestone, and the soil is for the most part a sandy or gravelly loam. The surface of the surrounding country is rolling and diversified by numerous small lakes, with tamarack swamps and peat bogs scattered here and there. The timber is mainly hard wood, but now and then an aged, solitary, pine or a group of younger pines in an out-of-the-way nook reminds us of the fact that we are within the limits of the pine region, while much of the land formerly covered by pine is now occupied by a growth of low oak scrub. The flora is of a mixed character, the locality being just within the pine belt, and the Grand River valley also forming the northern limit of many southern species, such as the papaw, tuliptree, honey locust, flowering dogwood, tupelo, etc. The mean annual temperature is about 47°, and the average annual rainfall about 36 inches, while the season lasts usually from the middle of April to the fore part of October. The fall of 1890, however, was an unusually late one, and many species were on the wing till the end of October, *Colias philodice* being seen even on the 6th (about a dozen) and on the 20th (one) of November.

The following list of species is the result of ten years' observation, and covers the immediate vicinity of Grand Rapids within a radius of about ten miles :—

1. *Danais archippus.*—Very common. Appearance as follows : The hibernating individuals, from the middle of May to late in June ; of the first brood, the larvæ in June, the butterflies from early in July to August 15th ; of the second brood, the larvæ late in July and early in August, the butterflies from the end of August to the middle of September ; of the third brood, the larvæ in September, the butterflies in October and, after hibernation, again the next May. It is thus three-brooded, and if we disregard the time spent in hibernation, the life of each brood is from two to two and a-half months. It is a very strong flyer, and is often seen hovering about the tops of trees at a considerable distance from the ground, especially near sunset, when seeking a hiding place for the night.

2. *Euptoieta claudia.*—One specimen; Lamberton Lake, in July, 1887.

3. *Argynnis idalia.*—Rare. Taken at Lamberton Lake during the early part of July; is not as strong a flyer as are our other larger Argynnids.

4. *Argynnis cybele.*—Common. From the end of June to the middle of August, frequenting, with the other species of the genus, low, wet ground.

5. *Argynnis aphrodite.*—Common. Flies from about the first week in July to the end of August.

6. *Argynnis alcestis.*—Not rare, but less common than the preceding, from which it may be told in most cases, even on the wing, by its more ruddy colouring.

7. *Argynnis myrina.*—Common. Two broods during the season, the first flying from June 10th to the middle of July, the second from the early part of August through September. A worn specimen was taken in 1890 as late as the 8th of October. Prof. E. A. Strong, once of this place, now of Ypsilanti, Mich., is of the opinion that this species was formerly rather rare.

8. *Argynnis bellona.*—Common. Two-brooded, appearing from May 10th to June 15th, and from July 1st to August 15th.

9. *Melitæa phaeton.*—Common at several localities, from which, however, it never strays. One damp, boggy meadow, where it was formerly very abundant, has been recently drained and part of it cultivated, the result being the extinction of the species at that place. Here were taken all of the three specimens of the var. *superba*, of the capture of which I know. The species flies from the end of June to the latter part of July.

10. *Melitæa harrisii.*—Rare. Taken over low meadows from the middle of May to the middle of June.

11. *Phyciodes nycteis.*—Sometimes quite common. Two-brooded, appearing in June and again in August.

12. *Phyciodes carlota.*—One specimen, the date of which is lost, but taken, I think, early in June; a fresh example.

13. *Phyciodes tharos.*—Common. Two broods; the first form, *morpheus*, flying from June 10th to July 15th; the second, *marcia*, from the early part of August into September. A worn specimen was taken October 8th, 1890.

14. *Grapta interrogationis.* — Common most years, some quite abundant. Flies in early spring up to June 15th ; the larvæ of the first brood appear about the end of June, and the butterflies are on the wing from July 10th to the end of the month ; a second brood of larvæ is found about that time, and these give butterflies from the 10th to the end of August ; the third brood flies late in fall and hibernates. The hibernating butterflies are mostly *fabricii*, while *umbrosa* is more abundant in the summer broods.

15. *Grapta comma* —Common. Flies from early spring to the first of June, again, the form *dryas*, from July 1st to August 15th, while the second and hibernating brood appears late in the fall.

16. *Grapta progne.*—Rather common. Early in spring, again in July and August, and a second brood late in the fall hibernating.

17. *Grapta j-album.*—Not common, though much more so than formerly. Appears early in September, and flies throughout the fall and again in early spring. Our hardiest butterfly, appearing at any time in the winter that the weather is at all favourable. Under date of January 3rd, 1892, I have this note : "Coldest day of winter thus far, the thermometer registering, at 7 a.m., 11°, and though the sun shining brightly all day, the snow only melting in sheltered spots. At 4 p.m. took a *G. j-album* resting, wings erect, on the snow in the middle of the sidewalk of a well-travelled street. Was chilled, but soon revived in the house." All the Graptas, together with *Van. antiopa*, are common early in the spring around trees from which sap is flowing.

18. *Vanessa antiopa.*—Very common. Sometimes becoming a pest by defoliating young elms. Usually three-brooded, the hibernators flying from early spring to the end of May, the larvæ of the first brood appearing early in June, and the butterfiies from the 10th of the month to the 20th of July ; the larvæ of the second brood are found in the fore part of July, the butterflies during August ; of the third brood, the hibernating individuals, the larvæ in September, the butterflies from September 20th onward.

19. *Vanessa milbertii.*—Common ; inclined to be local. Three broods, appearing as follows : The hibernating specimens from early in spring to June 15th ; of the first brood, the larvæ during the latter part of May and early in June, the butterflies from the end of June to July 15th ; the larvæ of the second brood in July, the butterflies during

August; the larvæ of the third or hibernating brood during the latter part of August, the first butterflies about September 20th. I have noticed in a few instances the construction of a web by colonies of young larvæ.

20. *Pyrameis atalanta.*—Common. Two-brooded. The hibernating individuals are seen from the end of April to the latter part of June; the larvæ of the first brood may be found in June, the butterflies from July 10th to August 15th; the larvæ of the second brood during August, the butterflies from the 15th of September.

21. *Pyrameis huntera.*—Common. Two-brooded, flying in the latter part of June and in July, and again in September and October, being then most abundant in clover fields. Hibernating specimens occur, no doubt, early in spring, but I have no record of observations at that time.

22. *Pyrameis cardui.*—Usually common, but some years quite infrequent. In 1884 was very abundant throughout the season, the thistles and burdocks being stripped, and the nettles, mallows, sunflowers and hollyhocks also attacked. It is usually two-brooded, flying from the latter part of May through June; again, from larvæ in June, in July and August; and again, the second brood of the year, from the second week in September onward.

23. *Limenitis ursula.*—Rather common, though formerly rare. Two-brooded, flying during June and early July and again in the latter part of August. It is very much attached to certain localities, and in one door yard for several years it has never failed to appear, at any time during its season, one having to wait but a few minutes to see one or more. It likes to fly along paths in woods and, like *disippus* and the species of *Pyrameis*, *Grapta* and *Vanessa*, has the bad taste to frequent heaps of decaying animal and vegetable refuse.

24. *Limenitis disippus.*—Common. Two-brooded. The first brood flies during June, the second from August 15th through September, one being seen on one occasion on the 8th of October. It frequents especially willow bushes lining the banks of streams.

25. *Apatura clyton.*—One specimen of the form *proserpina* taken by Mr. L. S. Livingston, a former local collector, a few miles east of the city, on the 15th of July, 1885. I am also informed by Prof. E. A. Strong that two or three were taken near the city some years ago.

26. *Neonympha canthus.*—Common during July, frequenting low grounds and swampy meadows.

27. *Neonympha eurytris.*—Common. In June in open woods.

28. *Neonympha mitchelli.*—July 1st, 1885, three years before the species was described, I found it rather common near South Grand Rapids in company with *canthus*, but had neither specimens nor authorities from which to pronounce upon its newness. Have found it quite common at the same locality, a bog some two acres in extent, every year since, from the 1st to the 15th of July. It is readily told on the wing by its dark colour, small size, and weak flight; but owing to its fragility and its habit of flitting low amongst grass and weeds, perfect specimens in any number are difficult to obtain.

29. *Satyrus alope.*—Formerly found here, as I learn from older collectors, but disappeared several years ago.

30. *Satyrus nephele.*—This form is now common in July at two or three localities—low, wet meadows—and specimens are found of the var. *olympus* and others approaching var. *nephele.*

31. *Libythea bachmani.*—One specimen taken in August, 1883, by Mr. C. S. Osborne, a local collector, and another by myself in 1887. August 21, 1885, Mr. L. S. Livingston found a nearly full-grown larva of this species beneath a hackberry tree at the same locality at which the butterflies were captured, and at which the *Apatura clyton* was taken.

32. *Calephelis borealis.*—Taken in July at two or three localities, but only at all common in two low, wet, grassy areas near Lamberton Lake, each less than an acre in extent.

33. *Thecla acadica.*—Common in July, frequenting especially the flowers of butterfly-weed and New Jersey tea.

34. *Thecla edwardsii.*—Rather common, in company with the next, late in June and early in July, on the leaves of low scrub oaks.

35. *Thecla calanus.*—Quite common, and like the preceding, has a curious habit when resting on a leaf of rubbing the upper surfaces of its wings together, giving the tails an upward and downward motion.

36. *Thecla strigosa.*—Rare. July, on the butterfly-weed and New Jersey tea.

37. *Thecla niphon (?)*—In my notes under the date of May 2, 1885, I have this observation: "A *Thecla (Niphon ?)* was seen but was unable to capture it." This could have been none of the other species named, and from the date and our being in a pine region, am inclined to think it this species.

38. *Thecla titus.*—Common. Appearing about the middle of July and flying a month or so, frequenting particularly the butterfly-weed.

39. *Chrysophanus thoe.*—Common, especially in tracts of blue flag from June 10th to the 1st of July, and from August 15th to the middle of September.

40. *Chrysophanus epixanthe.*—Very common at Lamberton Lake, flying over tracts of shrubby cinquefoil *(Potentilla fruticosa).* I have taken it from June 10th to September 19th, and it is common at all times between, though I think there are two broods in reality.

41. *Chrysophanus hypophlœas.*—Common. Flies from May 10th to June 15th, from July 15th to August 15th, and again from September 20th to October 9th, when I have seen worn specimens. It is thus apparently three-brooded, but I believe that of the larvæ from the summer brood some mature and give imagos in the fall, while others go over to spring, and that it is really two-brooded.

42. *Lycæna lygdamus.*—Rare. Late in April and early in May along muddy cow-paths. Very local.

43. *Lycæna pseudargiolus.*—Form *violacea* is not common, appearing in April and early May, while *neglecta* is a common form from June 10th to the latter part of August, and seems in some specimens to approach var. *pseudargiolus.*

44. *Lycæna comyntas.*—Common in May on willow blossoms. Again found from July 15th to August 15th, delighting in wet, muddy places in woods. In 1890, fresh specimens were taken again September 20th, but I believe these were disclosed from chrysalides which should have gone over till the next spring.

45. *Pieris protodice.*—Very common in fall from August 10th to the end of September, but the spring form, *vernalis*, is rather rare, appearing from the end of April to the middle of June.

46. *Pieris oleracea.*—Not common. Low ground; in May and again in July and August.

47. *Pieris rapæ.*—Very common. Several broods, appearing continually throughout the season. The earliest of my dates is April 7th, the latest October 13th. The species was here when I began collecting in 1883 and I have taken it ever since. Am unable to give the date of its first appearance.

48. *Meganostoma cæsonia.*—Formerly found here, I am told, but rare.

49. *Colias eurytheme.*—Once seen, July 20th, 1886.

50. *Colias philodice.*—Very common and producing about four broods in a season, its appearance some seasons being nearly continuous from the first of May to the end of October, and in 1890 seen November 20th. Occasionally in spring a form resembling *anthyale* is seen, expanding but 1.5 inches. Var. *alba* is more abundant in the late summer broods. A third variety occurs which I have nowhere found described, but which is distinct from any variety given in Smith's List, and seems to me to merit a varietal name.

Colias philodice, var. *luteitincta*, nov. var.—Differs from the normal *philodice* in the possession of an orange shade upon the primaries extending from the middle of the posterior margin to the median vein, shading off in all directions into the yellow ground colour, and occupying exactly the position of the orange patch in *Col. eurytheme*, var. *ariadne*. The secondaries also in most specimens show an orange flush in the central portion. I first met this form in company with *eurytheme* and *philodice* in August, 1885, at Batavia, Ills., and supposed the specimens to be hybrids. But have since taken it at different times at Grand Rapids, where *eurytheme* has been seen but once, and have collected in all about a dozen specimens, one of them a female. I find the colouring very constant and sufficiently marked to distinguish the form even when on the wing. Have recently seen a specimen in a collection at Lansing, Mich. Edwards figures an orange variety and suggests the possibility of its being a hybrid between the two species, *eurytheme* and *philodice;* it is not like this and appears much more likely to be, as suggested, a hybrid.

51. *Terias lisa.*—Rare. One specimen taken east of the Michigan Soldiers' Home, August 10, 1891.

52. *Papilio ajax.*—Formerly rare, but has been becoming constantly more common with the spread of the papaw, upon which it feeds, till now it is very common in the southern part of the country and quite so at Grand Rapids, especially in the vicinity of its food-plant. Vars. *telamonides* and *walshii* fly from the early part of May to the latter part of June, and *marcellus* from the end of July to the end of September.

53. *Papilio turnus.*—Common from the end of May to the early part of July, congregating about wet places in roads, etc. Var. *glaucus* is rare. Two specimens have been taken on the wing and one reared from a larva collected on cultivated cherry.

54. *Papilio cresphontes.*—Not uncommon in June.

55. *Papilio asterias.*—Rather common. Two-brooded, the first being on the wing from the end of May to the first of July, the second during August and fore part of September.

56. *Papilio troilus.*—Our most common *Papilio.* Two-brooded, flying from the middle of May to the end of June, and from the beginning of August to September. In one case a battered specimen was taken September 25th.

57. *Ancyloxypha numitor.*—Common. One brood in June and another in August. Flies in low, wet meadows.

58. *Thymelicus poweshiek.*—Common at Lamberton Lake in July. In flight and habits generally much like the preceding.

59. *Pamphila hobomok.*—Common. June. More abundant at certain localities, and, like all the species of *Pamphila*, seems to prefer low, swampy tracts and wet meadows. Several specimens of the var. *pocohontas* have been taken.

60. *Pamphila sassacus.*—Rather common in June in company with *mystic* and *peckius.*

61. *Pamphila leonardus.*—Rare. Flies from August 10th to the end of the month.

62. *Pamphila egeremet.*—Not common. July.

63. *Pamphila peckius.*—Very common. Apparently two-brooded, one brood appearing early in June, the other during the first week in August.

64. *Pamphila mystic.*—Common. From early June to the middle of July.

65. *Pamphila cernes.*—Very common. Two broods during a season, one flying from June 10th to July 15th, the other from August 15th to the end of September. In 1890, took a fresh female on October 4th. A female taken in July, 1892, differs from the normal form in an almost entire lack of fulvous in the cell.

66. *Pamphila manataaqua.*—One specimen, July 14th, 1892.

67. *Pamphila metacomet.*—Rather rare. Flies during the latter part of July.

68. *Pamphila bimacula.*—One female taken July 20th, 1892.

69. *Pamphila pontiac.*—Common in July. Have a male specimen in which the under surface of one secondary is suffused with brownish so as to completely obscure the normal pattern of the wing.

70. *Pamphila dion.*—Common in July, last year, at one locality in company with *pontiac*, and upon the wing much resembling that species.

The range is much wider than given in French, as I have specimens from Western New York.

71. *Pamphila delaware.*—Usually not very common, but last year was quite abundant at two or three localities. Flies in July.

72. *Nisoniades brizo.*—Not common. Appears early in May.

73. *Nisoniades icelus.*—Rather common from the end of May, through June, and once taken, a battered example, as late as July 14th.

74. *Nisoniades lucilius.*—Found, but not common, in June.

75. *Nisoniades persius.*—Not common. Flies about the end of May.

76. *Nisoniades juvenalis.*—Common in June. The species of *Nisoniades* seem to appear in spring about in this order: first *brizo*, then *icelus*, *persius* and *juvenalis*, and lastly *lucilius*. They all delight in recent clearings in the woods and in tracts of bushes, stumps and brush-heaps.

77. *Pholisora catullus.*—Common. Two-brooded, appearing in June and again in September, the second brood being especially common around door yards and waste places where grow different species of *Amarantus*, especially *A. albus*. The larvæ are also found on *Chenopodium album*.

78. *Eudamus pylades.*—Quite common. Seen in spring from the middle of May to the middle of June, preferring open woods.

79. *Eudamus tityrus.*—Common. From the end of May to the middle of July, but seems to prefer a solitary life and more than two or three are never seen at any one time.

From this list it appears that 79 species of butterflies have been taken at this locality; one or two remarks, perhaps, would be of value concerning certain ones. As to the Papilios, from information received from Prof. E. A. Strong, who began to collect at this place some thirty years ago, it appears that *troilus* has constantly grown more common, and *asterias* and *turnus* less so; *ajax* was once extremely rare, and the first *cresphontes* was not taken till some years after Mr. Strong came here, though he is unable to give me the exact date. *Pieris rapæ* has, of course, appeared in comparatively recent times, and as it has become more common, Mr. Strong thinks *protodice* has decreased in numbers, while *oleracea* is certainly much less common than it was ten years ago. *Sat. alope*, once taken, has disappeared and *nephele* become common, but not however at the same locality. *Arg. myrina*, *Grapta j-album* and *Lim. ursula* have also grown more common of recent years.

I desire in closing to call attention to one locality near this city which is, it seems to me, a remarkably productive one, and that is the vicinity of Lamberton Lake. Upon one day last summer, July 14th, I observed there 34 species, in a tract less than a mile in length :—*Dan. archippus*, *Arg. aphrodite*, *alcestis*, *myrina*, *bellona*, *Mel. phaeton*, *Phyc. nycteis* (worn), *tharos*, *Grapta comma* var. *dryas*, *progne*, *Van. antiopa*, *Lim. ursula*, *disippus* (worn), *Neon. canthus*, *eurytris*, *Sat. nephele*, *Cal. borealis*, *Thecla acadica*, *edwardsii*, *calanus*, *Chrys. hypophlœas*, *epixanthe*, *Pier. rapæ*, *Col. philodice*, *Pap. asterias* (one), *Thym. poweshiek*, *Pam. peckius*, *cernes*, *pontiac*, *egeremet*, *mystic*, *delaware*, *manataaqua*, and *Nis. icelus* (worn). A very long list, it seems to me, for one day in one locality.

TRYPHON FLAVIFRONS, N. S.

BY REV. THOMAS W. FYLES, F. L. S., SOUTH QUEBEC.

Antennæ, filiform, brown; number of joints, twenty-seven; scape, large, ovate, pale yellow beneath. Eyes naked, large and prominent, dark rosy brown. Clypeus, labrum, mandibles and palpi pale yellow. The lower portions of the epicranium are of the same colour. The occiput is black, smooth and glossy. Mesothorax highly convex, black, sparsely set with short, pale-brown, retrorse hairs. Scutellum elevated. Tegulæ yellow. The under parts of thorax amber-coloured, as are also the legs, with the exception of the tarsi and parts of the tibiæ of the hindmost pair, which are brown.

Wings hyaline. Costal and sub-costal nervures coalesce: stigma large; basal nervure much curved inwardly; the second transverse cubital nervure wanting; third submarginal cell large; second transverse cubital nervure short and straight; recurrent nerves straight and parallel; second discoidal cell rather small.

Abdomen long, flattened, sessile, black above, yellow beneath. Ovipositor black, short and straight, the case set with black bristles beneath.

Length of body, three-tenths of an inch, and of antennæ two-tenths. Expanse of wings, four-tenths. The fly makes its appearance in August.

Described from six specimens obtained from Nematus larvæ that had fed on a species of poplar *(P. nolesti)* imported from Russia, and that had gone into cocoon.

THE SONG OF THYREONOTUS.

BY WILLIAM T. DAVIS, STATEN ISLAND, N. Y.

Mr. Samuel H. Scudder, in the Report of the Ontario Entomological Society for 1892, gives an interesting account of the "Songs of Our Grasshoppers and Crickets," and kindly permits the stridulations of a number of Staten Island insects to be heard mid the general medley. There is, however, an additional songster to be added to this list, as appears from the following.

On the 26th of last June I heard in a moist pasture, on the north shore of the Island, a stridulation that was unknown to me. It much resembled that produced by *Orchelimum vulgare*, with the preliminary zip, zip, omitted. It was a continuous *z e e e*, with an occasional short *ik*, caused by the insect getting its wing-covers ready for action after a period of silence. It was too early for *Orchelimum vulgare* by about a week; at least I have never heard one on the Island before the fourth of July; so in the present instance I made careful search for the musician. In due time I discovered, in a tussock of rank swamp grass, the brown songster perched on a dead leaf, and receiving the evidently welcome rays from the afternoon sun. It was *Thyreonotus pachymerus*, and in the swampy field about me I heard others of its kind, so that this individual was only one of a considerable colony.

A failure to make proper use of his legs (the wings are abortive), resulted in the transfer of Thyreonotus from the tussock to a tin can. At home I made a bowery for him in a larger tin can covered with netting, into which was introduced a branch of the coriaceous leaved post oak, and when the leaves dried, there were innumerable nooks and crannies wherein to hide. Usually, however, the insect did not hide at all, but perched himself on one of the topmost leaves and there waved his antennæ after the manner of all long-horned Orthoptera. Starting with raspberries, he had the rest of the fruits in their season, including watermelon, of which he showed marked appreciation. If I offered him a raspberry, and then gradually drew it away, he would follow in the direction of the departing fruit and would finally eat it from my hand.

As the bowery was kept in my bed room, I had the full benefit of the songs of its occupant, and was often awakened in the night by his sudden, alarm-like outburst of melody. He stridulated with unabated zeal to the first of August, when I noticed that his energies were lagging—he

seemed to be much less sprightly. Finally his song, instead of filling the room, was but a faint sound, and I was obliged to place my ear close to the tin can. This was nearing the end, which came either on the tenth or eleventh of September, I cannot say which, for the bowery was not disturbed until its occupant had been missing from the upper leaves for several days.

Once or twice during his captivity he took unnecessary alarm at my well-meant efforts to "fix" the bowery, and whacked his head most insanely against the tin can, being propelled thereto by his muscular hind legs. However, no harm seemed to result from these little fits of nervousness, and he evidently died quietly enough in the end.

I have observed in other kinds of grasshoppers the subsidence in the volume of song as they grew older, which evidently makes it unsafe to take the efforts of a single individual as the standard of the species, especially if the time is late in the fall.

NOTES ON LEUCANIA PSEUDARGYRIA, GUEN.

BY REV. THOMAS W. FYLES, F. L. S., SOUTH QUEBEC.

Full-grown larva.—Length, two inches. Colour greenish-brown above, greenish-grey beneath. Pale dorsal and side lines. Spiracles black. Head and scale on second segment light reddish-brown; jaws darker brown. This description agrees with that given by Mr. Caulfield in Vol. XIII. of the CANADIAN ENTOMOLOGIST, page 132.

The larvæ, like those of *Arzama obliquata*, feed in the stems of *Typha latifolia*. The two species may sometimes be found in the same plant. They are plentiful in the swampy ground at the foot of Mount Royal, Montreal. Both sometimes become the prey of the maggots of *Chætopsis ænea*, Wied.

Pupa.—Length, one inch and a-quarter. Colour light brick-red. Forepart rounded abruptly and terminating in a beak-like projection, resembles the head of a bird. Thoracic portion of case curves backward on either side to a point. Wing cases large.

My specimens underwent the pupal change amongst the accumulated frass in their tunnels; but doubtless the larvæ sometimes leave the food-plant and seek hibernacula elsewhere, as do those of *Arzama obliquata*. (See Mr. Caulfield's notes referred to above.)

TWO NEW CYNIPIDS FROM WASHINGTON STATE.

BY C. P. GILLETTE, FORT COLLINS, COLO.

In February of last year I received a box of galls from Mr. Trevor Kincaid, of Olympia, Washington, for identification. The galls were taken from *Rubus Nutkanus*, and the flies reared from them early in the following March prove to be a new species, which I take pleasure in dedicating to Mr. Kincaid.

Diastrophus kincaidii, n. sp.

Gall.—Either of the two galls in my possession measure almost exactly 1¼ inches in length by three-fifths of an inch in greatest diameter, and are upon twigs that do not exceed 2½ mm. in diameter. The galls are abrupt enlargements of the twigs, and they are literally filled with larval cells. The portion of the gall-subtance lying outside the cells is quite pithy, but the portion forming the septa between the cells is hard and woody. The surface of the gall is smooth, but is irregularly swollen or lumpy, much as in the gall of *D. nebulosus*.

Gall-fly.—Female. Black; legs, dark rufous; length, 2 to 2½ mm.

Head: face, coarsely striated; frontal carina, smooth and shining and but little elevated (it seems like a ridge made by two depressed lines, one on either side) vertex, genæ and occiput smooth and shining; ocelli, inconspicuous; face, sparsely set with very fine pubescence; mandibles, somewhat rufous at base; antennæ, 13-jointed and black in colour. Thorax: mesonotum, nude, polished; parapsidal grooves distinct; median groove also distinct, but extending only a short distance from scutellum; prothorax, striate; mesothoracic pleuræ, shining, finely aciculate over a portion of the surface; scutellum rugose, bifoveate. Abdomen, entirely black; petiole, fluted, second segment occupying one-half of the dorsum. Wings, 3 mm. long; hyaline; 1st and 2nd transverse nervures, quite black, but not very heavy; areolet, small.

The male differs from the female in being only one and three-fourths mm. long, having antennæ 14-jointed, and having the abdomen smaller.

Described from 25 females and 14 males bred from the galls.

Synergus garryana, n. sp.

Female. General colour rufous, with tips of mandibles, compound eyes, vertex between ocelli, occiput, lower half of mesopleuræ, metathorax, pedicel of abdomen and two blotches on second abdominal segment, one next the petiole and one just beyond the middle of the dorsum, black.

Head; face entirely yellowish-rufous, coarsely striated and sparsely set with short hairs; vertex rugose-punctate; antennæ 14-jointed, and in colour like the face, a little infuscate at the tip. Thorax above a little darker rufous than the face, transversely rugose; parapsidal grooves narrow and rather indistinct, but extending to the collar; no median groove; parallel lines extending back from the collar, short and rather indistinct, sparsely set with short recumbent hairs; scutellum coarsely rugose, the foveæ oblique and shining black at the bottom; mesothoracic pleuræ coarsely aciculate; in two specimens the lower half only is black, and in two others, a little smaller, the entire pleuræ are black. Abdomen: petiole coarsely striated; second segment very smooth and shining, and finely punctured on outer third. Legs, including coxæ, uniform light yellow, except the tarsi of the third pair and the tips of the last tarsus in the others, which are black. Wings hyaline, nervures light, areolet obsolete. Length, 2½ to 3 mm.

Male. The male differs from the female as follows: Length, 2¼ mm.; vertex above antennæ, except a narrow orbital line, black; antennæ, 15-jointed; thorax, entirely black; abdomen, black, except the tip of the second segment, which is yellowish, and the entire tibiæ of the pair of legs are blackish.

The above descriptions are made from four females and five males which issued from the galls between March 1st and 10th, 1893.

The galls from which this very pretty Synergus was reared resemble very closely those of *Holcaspis monticola*, Gill, MS., the description of which is already in the hands of the printer for publication. The galls were collected by Mr. Trevor Kincaid, of Olympia, Washington, from twigs of *Quercus garryana*.

WHICH SIDE OF THE TREE DOES PHLŒOTRIBUS LIMINARIS ATTACK?

BY F. M. WEBSTER.

Recently, while studying the habits of this beetle in the peach orchards of Catawba Island, on the south shore of Lake Erie, I was surprised to observe that the fall attack had invariably been made on the east or south-east side—which is here the land side of the trees—and old trees, where the bark of the trunks was very rough, were more seriously affected. On mentioning the fact of this apparent discrimination in point of attack to my friend Dr. D. S. Kellicott, he recalled that the same phenomenon occurred about Buffalo, New York.

Here in Ohio, in every case where the writer has observed it, the adults only have been found, wintering in burrows or chambers in the bark clearly excavated by themselves after becoming fully developed and not during larval stage.

On February 10, I took from a peach tree in Eastern Arkansas, adults, pupæ and what I presumed to be larvæ of this species, from all sides of the tree, which, by the way, was rather a young one with bark comparatively little roughened. This tree stood just above high water mark, on the eastern foot of Crawley's Ridge, which marks the western boundary of the swamp or overflowed country to the west of the Mississippi River. There was here, certainly, no partiality shown for any particular side of the tree. Are the beetles in Northern Ohio and Western New York driven to the discrimination previously noted by the lake winds, at the time they burrow into the bark in the fall, and has such selection in point of attack been observed elsewhere, except near and to the south of the Great Lakes?

CORRESPONDENCE.

TRYPETA, CLISIOCAMPA AND AMMALO.

The January and February numbers of the CANADIAN ENTOMOLOGIST just to hand suggest a few remarks. Prof. Townsend gives a most interesting account of the *Bigelovia* Trypetid, and although I had described the imago as well as the gall in Ent. Mo. Mag. (Dec., 1890, p. 324), most of what he writes is new. The eyes, as Prof. Townsend surmises, are green in life. The variety from Johnson's Basin seems to have the character of my var. *disrupta*. The hymenopterous parasite mentioned on page 52 may perhaps be a *Torymus*, identical with one I bred at West Cliff. I also bred from the galls a new *Eurytoma* (*E. bigeloviæ*, Ashm.) and a weevil, *Anthonomus canus*, besides the Cecid, which I described as *Cecidomyia bigeloviæ*. At West Cliff, Colo., a *Clisiocampa* is very common, which, according to Mr. Dyar, must be referred to *C. fragilis*, Stretch. I had always called it *californica*, following Dr. Packard's opinion. An account of this insect will be found in the 4th Rept. of the Colo. Biol. Assoc., where the distinctness of certain of the larvæ from *californica* is alluded to. *Populus* and *Salix* may be added to the list of food-plants. I also found larvæ on *Ribes aureum*. I found the eggs on willow branches in batches; colour pale greyish, shape elongate, egg-shells iridescent within. *Ammophila robusta* is an enemy of the larva, but I did not notice any parasites. On page 27 Mr. Dyar refers to *Ammalo helops*. This gets nearer to the U. S. than Surinam, at all events, since Möschler in 1886 recorded it from Jamaica. With reference to the foot note on page 52, it is only fair to state that the trypetid nature of the *Bigelovia* galls was first discovered at the Department of Agriculture, Washington. This was before I had bred the imago.

Feb. 19, 1893. T. D. A. COCKERELL.

Mailed April 11th.

LIBRARY OF SCIENCE

The Canadian Entomologist.

VOL. XXV. LONDON, MAY, 1893. No. 5.

NEW SPECIES OF FOSSORIAL HYMENOPTERA.

BY WM. J. FOX, PHILADELPHIA.

MYZINE THORACICA.

♀.—Clypeus strongly and closely punctured, carinated or angular down the middle; front with large, coarse punctures, which become sparser on the vertex and cheeks; the ocelli deeply pitted, the hind pair almost hidden; prothorax, mesopleuræ, dorsulum and scutellum with large, separated punctures, those on the dorsulum by far the largest and sparest; metathorax above and behind entirely smooth, the metapleuræ with oblique striations; legs, especially the tibiæ, coarsely punctured, the outer side of the medial and hind tibiæ covered with strong, short bristles, and in addition with a row of stout, short spines on the outer edge, the medial and hind tarsi with long bristles and spines; anterior tarsi with the spines stout, the longest equalling the length of the first joint of that tarsus; wings flavo-hyaline, somewhat fuscous apically, the nervures testaceous; abdomen with a beautiful iridescent sheen dorsally, with fine rather close punctures, the first segment and base of the following three impunctate; on the apical portion of segments 1–3 the punctures are sparse and stronger, those on the fifth segment stronger; ventral segments on apical portion with large punctures or holes, which form on segments 1–4 a transverse row, which is produced forward into an angle medially; last dorsal segment with fine longitudinal striations. Black: mandibles, except apical portion, apex of scape, base of femora beneath, apex of fore tibiæ, the remaining tibiæ above and the tarsi. Rufous: a spot at the extreme side of clypeus, a transverse mark on front behind antennæ, interrupted medially, which extends up along the inner orbits and coalesces with the mark on the vertex—this latter extends down on the cheeks; prothorax above, except two elongate, transverse marks, two large spots on mesopleuræ, middle and outer lobes of the dorsulum in part, tegulæ, scutellum, post scutellum, a large spot in middle of metanotum, a much larger one on each side of the posterior face, which extends around on the sides; the

femora and tibiæ in part, a transverse band on dorsal segments 1–5 of abdomen, all of which except the first are narrowed medially, the first and second slightly separated, that on the third segment somewhat squarely emarginate behind, and ventral segments 2–4 with a large spot, those on the second segment longitudinal, the others transverse; mandibles and labrum fringed with testaceous hairs; head, thorax, legs and abdomen beneath with long, pale hair. Length, 18–20 mm.

So. Illinois *(Chas. Robertson)*. One specimen has the markings on the abdomen narrower, the band on the second segment widely divided in the middle, the third ventral segment immaculate, and the front with a longitudinal medial yellow line. Allied to *sexcincta* and *caroliniana*. From the first mentioned it is distinguished by the entirely smooth metathorax, the richer livery; from the latter by the stronger and closer punctuation of the front and ventral portion of the abdomen and larger size. It may, however, prove to be but a variety of *sexcincta*.

Pompilus relativus.

♀.—Anterior margin of clypeus distinctly but not strongly incurved; ront with the impressed line obliterated in the middle, but very strong behind the antennæ and before the ocelli; posterior margin of prothorax subangular: metathorax rounded behind, upper surface with a rather strong, longitudinal, impressed line, which terminates at base of posterior face, the latter depressed; tibiæ and tarsi strongly spinose; tarsal claws toothed at the base; longest spur of hind tibiæ more than half as long as the first joint of hind tarsi; wings deep blackish violaceous, the apical margins even darker, third submarginal cell triangular, the second and third cubital transverse veins very contiguous at the top, second recurrent nervure sinuous, received by the third submarginal cell at about the middle; ventral abdominal segments with a few erect hairs, which are most dense and prominent on apical segment. Black, with a very slight bluish reflection, which is most obvious on the abdomen; legs and antennæ entirely black; head and anterior coxæ with numerous long, black hairs, the prothorax and dorsulum also with a very few hairs. Length, 18 mm.

Two specimens. Ocean County, N.J. *(Prof. J. B. Smith);* So. Illinois *(Chas. Robertson)*. Related to *philadelphicus*, *æthiops* and *maurus*. The clypeus is much less incurved than in either of the first

two species, and the third submarginal cell differently shaped. From *maurus* it differs by having the tarsal claws toothed, instead of cleft. Its position is between *æthiops* and *maurus*.

Pompilus posterus.

♀.—Anterior margin of clypeus very slightly incurved; frontal impression distinct; posterior margin of prothorax bowed; metathorax not impressed above; tibiæ and tarsi very strongly spinose, the longest of those on the fore tarsi almost equalling the first joint of that tarsus in length; tarsal claws cleft; longest spur of hind tibiæ much more than two-thirds as long as the first joint of hind tarsi; wings hyaline, the apical margin broadly fuscous, nervures black; third submarginal cell narrowed about one half at the top, the second recurrent nervure received by it a little beyond the middle. Black: head, thorax, legs and first abdominal segment clothed with silvery pile which has somewhat the appearance of verdigris; hind femora and tibiæ (the spurs excepted) rufous; posterior margin of prothorax narrowly whitish; head with rather sparse, pale hair. Length, 7 mm.

♂.—More slender than the female, antennæ shorter and stouter; the tibial spurs, transverse band at base of third dorsal segment, and spot at apex of abdomen above, white. Length, 7 mm.

Camden County, N. J. (July); So. Florida (*Chas. Robertson*). Allied to *biguttatus*, from which it differs in the colour of the hind legs, the stronger armature of the legs and the greater length of the hind tibial spur.

Planiceps calcaratus.

♂.—Anterior margin of clypeus rounded; front strongly impressed on lower portion; anterior ocelli deeply pitted; antennæ reaching much beyond the tegulæ, the flagellum slightly tapering to the apex; hind margin of prothorax formed into a very slight angle medially; metathorax above with exceedingly fine punctures, with longitudinal, medial, impressed line; tibiæ with distinct, though not strong, spines, the tarsi scarcely or not at all spined; longest spur of hind tibiæ as long as the first joint of hind tarsi; wings sub-hyaline, iridescent, nervures fuscous, second recurrent nervure uniting with the second transverse cubital vein; black;

tibial spurs white; head and sides of thorax sparsely clothed with silvery-sericeous pile. Length, 6 mm.

So. Florida *(Chas. Robertson)*. Distinct from our only other known species, *feralis*, by the longer antennæ and hind tibial spurs, and by the white calcaria.

GORYTES DENTATUS.

♂.—Head not as broad as the thorax; ocellar region slightly raised, the ocelli forming a very low triangle; front with large, shallow, scattered punctures, the longitudinal impressed line strong; inner eye-margins slightly though distinctly converging towards the clypeus; scape but little if anything longer than the clypeus, is long in the middle, third antennal joint distinctly longer than any of the following, except the last, to which it is about equal; joints 10–12 emarginate beneath, the twelfth joint but slightly so; clypeus convex, with a few scattered, indistinct punctures, its anterior margin distinctly incurved. Thorax with strong, separated punctures, sparsest on the scutellum; in addition to the carina which runs from each shoulder tubercle around the fore edge of meso-sternum, there is behind it a transverse carina or ridge, which terminates in a stout tooth at the extreme side; enclosed space on metanotum well-marked, triangular, its sides somewhat incurved, on the basal portion it is longitudinally strongly striated, while on the apical narrow portion it is transversely striated, at the apex of the enclosure there is a strong pit; four posterior tibiæ and tarsi tolerably well furnished with spines; wings hyaline, a fuscous cloud completely fills the marginal, second and third submarginal, and the apical portion of the third discoidal cells; there is also a slight spot at apex of median and sub-median cells, stigma and costal nervure fulvous, the other nervures black. Abdomen with tolerably strong, separated punctures, strongest and more scattered ventrally, first segment at apex nearly as wide as the second, sessile with it, the second segment transversely swollen near the base, so that when viewed from the side the first and second segments are separated by a deep suture. Entirely bright ferruginous; tips of mandibles black; clypeus, front and face on sides, scape beneath, transverse line on collar, shoulder-tubercles, anterior portion of mesopleuræ, scutellum, a spot on four anterior tibiæ in front, first joint of medial tarsi at base, and apical margins of dorsal abdominal segments 1–3, pale yellow; the fascia on segments 2 and 3 narrowest

broadened at extreme sides; a broad fascia on second ventral segment and two large spots on the third, also yellowish; clypeus sparsely clothed with pale hairs. Length, 10 mm.

Grand Canon, Arizona, "70 miles North of Flagstaff." *(C. H. Tyler Townsend).* Not closely related to any of our species. It comes nearest to *G. spilopterus* and *tricolor*, but the sculpture is finer and the abdomen differently shaped. It differs from the ♂ of *tricolor* in the dentate mesosternum; the ♂ of *spilopterus* is as yet unknown, but *dentatus* differs too greatly to consider it the ♂ of that species.

MIMESA MACULIPES.

♂.—Anterior margin of clypeus subtruncate, entire; front with very fine, close punctures, which become sparse on the vertex, and strongly impressed medially; ocelli very prominent, placed in a triangle, on each side of the hind pair there is a strong depression; antennæ rather long, the flagellum clavate; first joint of flagellum about one-quarter longer than the second; dorsulum with very fine punctures, almost impunctate; suture between dorsulum and scutellum wide; scutellum impunctate, slightly impressed medially; metathorax very strongly rugose; the enclosed space at base of metanotum with numerous, somewhat oblique ridges; petiole in length distinctly shorter than the hind femora, almost straight, the upper surface with two widely separated furrows, on the sides the petiole is broadly channelled; remainder of abdomen impunctate, last dorsal segment smooth; black, the abdomen entirely so; flagellum beneath rufous; apex of four anterior femora, the tibiæ and tarsi, pale testaceous; hind tibiæ, except base and apex, black; face and clypeus with bright silvery pubescence, wings hyaline, nervures and stigma black. Length, 10 mm.

So. Florida *(Chas. Robertson).* Because of both recurrent nervures received by the second submarginal cell, I have placed this in *Mimesa.* It differs from all our species of that genus (?) by the entirely black abdomen. In my opinion *Mimesa* is but a section of *Psen.*

SYNOPSIS OF THE ASILID GENERA MALLOPHORA AND NICOCLES.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

With the exceptions of *Mallophora ardens*, Macq., and *M. fulviventris*, Macq., neither of which have been identified, the following table contains all the species belonging to this genus at present known to occur in America north of Mexico. Three species are known to me to inhabit Southern California: *fautrix*, O. S., originally described from Mexico; *Guildiana*, also found in Montana, Kansas and North Carolina; and a new species described below:—

1. Pile of abdomen light coloured, none black 2
   Pile of abdomen light coloured, many on the fourth or following segments black 5
   Pile of abdomen wholly black ..... *nigra*, Will.
2. Femora, except the extreme apex, black 3
   Femora largely or wholly red 4
3. Thorax destitute of black pile, first posterior cell broadly open ..... *megachile*, n. sp.
   Thorax with black pile, first posterior cell closed .. *clausicella*, Macq.
4. Femora wholly red, pile of legs largely black ..... *fautrix*, O. S.
   Femora marked with a distinct black spot on each, pile of legs light yellow ..... *Guildiana*, Will.
5. Pile of venter light coloured 6
   Pile of venter black ..... *orcina*, Wied.
6. Species not exceeding 15 mm. in length ..... *laphroides*, Wied.
   Species exceeding 20 mm. in length ..... *bomboides*, Wied.

Mallophora megachile, n. sp., ♂ ♀. Black, tibiæ and extreme apices of the four anterior femora yellow. Pile of entire body grayish-white, more yellow on the tibiæ, a few black ones on the antennæ, front, tips of posterior femora above, and many on apices of the posterior tibiæ and on all the tarsi; that on the hypopygium of the male rather dense, white, appressed and parted in the middle. A few black bristles at apex of each of the four posterior femora above, also on the under side of the posterior femora and on the posterior tibiæ. Halteres brown. Wings grayish-hyaline, costal and marginal cells darker; first posterior cell broadly open; apices of the fourth and of the three following veins nearly colourless. Antennal style less than three-fourths as long as the third joint.

Length, 12 mm. Los Angeles County, Cal. Four males and one female.

The following table contains all the species of *Nicocles* known to occur in America north of Mexico; of these, *rufus* and *scitulus* may belong to *Blacodes* :—

1. Third and fourth abdominal segments wholly black.....3
   Third and fourth segments largely or wholly red.....2
2. Body red, a black spot on the second abdominal segment.....*rufus*, Will.
   Body black, abdominal segments three to six largely red.....*abdominalis*, Will.
3. Wings hyaline, a brown cloud at base of each submarginal, posterior and of the discal cell.....*scitulus*, Will.
   Wings marked with brown in other places than these.....4
4. Antennal style one-half as long as the third joint.....5
   Antennal style only one-fourth as long as the slender third joint; eastern species.....*pictus*, Lw.
5. Fifth abdominal segment in the male more than three times as wide as long.....6
   Fifth segment less than three times as wide as long; California species.....7
6. Inhabits the Atlantic States.....*politus*, Say.
   Inhabits California.....*dives*, Lw.
7. Brown spot at tip of wing not crossing the first and second posterior cells; posterior tibiæ and tarsi of the male densely silvery within.....*argentatus*, n. sp.
   Brown spot at tip of wing crosses the first and second posterior cells; posterior tibiæ and tarsi of the male not silvery.....*æmulator*, Lw.

Nicocles argentatus, n. sp., ♂. Black, the tibiæ and apex of the sixth and sometimes of the fifth abdominal segment red. Front grayish-brown pollinose, face nearly flat, white pollinose and sparse whitish pilose, mystax on oral margin consisting of a few long yellowish hairs interspersed among about fourteen stout yellow bristles; pile of palpi and of occiput white, bristles of the latter yellowish. First joint of antennæ

slightly longer than the second, the third one and three-fourth times as long as the first two taken together, of nearly an equal width, the style nearly half as long as the third joint. Thorax marked with a broad median black stripe not extending on the posterior fourth, and on each side of it is a large brown pollinose spot divided by the suture and bounded in front by a black spot, also a brown spot on the humeri, elsewhere the pollen is grayish-white, the pile very sparse, white, the bristles brown; pleura brown pollinose in front, grayish-white pollinose behind, the fan-like row of hairs in front of the halteres white. Scutellum brown pollinose, a black spot at the base each side; bearing two brown bristles. Abdomen smooth, sparse grayish-black pollinose, that at base and sides of segments two to four gray, the fifth and sixth segments wholly silvery pollinose; second segment longer than wide, the others wider than long, the fifth being two and a-half times as wide as long; venter gray pollinose and with a median brown pollinose stripe, its pile and that of the legs white, the bristles of the latter white and yellowish; posterior tibiæ within, and the underside of their tarsi, densely silvery-white pollinose and pubescent. Wings hyaline, an indefinite pale brown spot extends from the tip of the auxiliary vein to the base of the fifth posterior cell, darkest in the marginal and interrupted in the first submarginal cell; a second brown spot covers the veins at bases of the first, second and third posterior cells; a scarcely apparent brown spot at base of second submarginal cell, and a large one filling apices of the marginal, first and second submarginal and of the first posterior cell, extending from one-half to three-fourths the distance from the tip to the base of the second submarginal cell, and sometimes connected with the first mentioned brown spot by a brown streak extending through the middle of the marginal cell; all posterior cells open, the anal cell closed.

♀.—Same as the ♂, except that the apices of the fifth and sixth abdominal segments are never red, the pollen covering these segments is never silvery, and the posterior tibiæ and tarsi are destitute of silvery pollen and pubescence.

Length, 8 to 10 mm. Los Angeles and San Bernardino Counties, Cal. Nine males and eight females in April.

DESCRIPTIONS OF CERTAIN NEW FORMS OF LEPIDOPTERA.

BY B. NEUMOEGEN AND HARRISON G. DYAR.

Family Lagoidæ.

Vein 1a of primaries present; median, 4-branched; vein 8 of secondaries arising from the subcostal, more than half the length of cell from base; ♂ antennæ pectinated to the tip.

Synopsis of genera :—

Antennæ long; body parts robust.

Veins 3 and 4 of secondaries stalked.. ..... *Carama.*

Veins 3 and 4 separate, arising from the median..... *Lagoa.*

Antennæ very short; body more slender..... *Dalcerides.*

Genus Dalcerides, *n. gen.*

Head very small, but with large eyes; palpi slender, antennæ *very* short, hardly as long as the thorax, finely bipectinated. Vein 1 of primaries free, unbranched; 1a present; median vein 4-branched, vein 2 arising beyond the middle, veins 3–5 from near together; cell broad, closed, with false discal vein; 6 from the middle of the retracted upper half of the cross vein, a small rounded accessory cell; 7–8 on a stalk from the pointed end of the accessory cell; 9 from the same point; 10 apparently absent; 11 from top of accessory cell, appearing to join 12, which is free from base. The secondaries have two internal veins; veins 2–6 as on primaries; 7 a continuation of the subcostal; 8 from subcostal on middle of cell, not diverging till end of cell; a discal false vein runs to the angulation of the cross vein between the origins of veins 5 and 6.

Type, *Artaxa ingenita*, Hy. Edw.

Family Notodontidæ.

Median vein of primaries 3-branched; 8 of secondaries from base, close to subcostal for a large part of its length; veins 3 and 4 not stalked.

Partial synopsis of genera :—

Outer margin of primaries entire.

♂ Antennæ pectinated to the tip, the pectinations as long or longer than their cilia.

Primaries without accessory cell.

Internal margin entire.

Vein 5 of secondaries weak or absent.

Tip of abdomen with a brush-like tuft... *Melalopha.*

Genus Melalopha, Hübn (= *Ichthyura*, Hübn.)

M. alethe, *n. sp.*

We have before us a ♀ specimen from Truckee, California, which seems to be undescribed. It is possible that we have to do with *M. apicalis*, though the description of Walker does not fit. It is allied to *M. multnoma*, Dyar, and *M. brucei*, Hy. Edw.

Colour, obscure gray or drab, with the usual deep brown thoracic mark. Fore wings slightly purplish ("ecru drab," Ridgway's nomenclature of colours, plate III., fig. 21), the lines as in *brucei* and *multnoma*, but white and narrower, more as in *pigra*, powdery, obsolescent, under the lens narrowly broken here and there, the fourth forming a distinct, somewhat S-shaped bend at costa, where it is slightly widened and distinctly white. The wing is very uniform in colour, without the contrasting shades of *brucei* and *multnoma*; there is no subapical rusty patch except the merest trace outside the 4th line, but a moderately distinct deep brown shade overspreads the whole apical portion of the wing from the third line outward, reaching downward to vein 3, and being most strongly marked in the region of the 4th line. It recalls the ornamentation of *M. anachoreta*, Fabr.; but is far from being as distinct as in that species. This shading is present in *M. var. ornata* and *M. brucei* and others, but these have also the shade bordering the 3rd line, so that the resemblance to *anachoreta* is obscured. Subterminal series of interspaceal dots nearly straight, very uniform, and not obscured by the shading.

Hind wings drab (Ridgway, plate, III., fig. 18), immaculate. Expanse, 28 mm.

The following table will serve to separate the North American forms of Melalopha. Omitted names are referred to the synonymy :—

Lines not anastomosing, the 3rd running free from internal margin to costa.

Only the 4th line present (?)..... .*apicalis*, Walk.

Lines all present.

Size large, basal line straight.

Colour dark, with black subapical patch. *albosigma*, Fitch.

Colour paler, patch brown..... .*var. specifica*, Dyar.

Size smaller, basal line angulated and curved.

Of uniform tint, subapical rusty patch very obscure..... .*alethe*, Neum. and Dyar.

Of contrasting shades with distinct subapical rusty patch.
Colour very dark, obscured.....*multnoma*, Dyar.
Colour pale, shades contrasted....*brucei*, Hy. Edw.
Lines anastomosing, the 2nd and 3rd joining at or about the median vein.
Lines all waved, the basal one both angulated and curved.
Size medium, ornamentation distinct.
Size moderate with the usual thoracic patch.
Colour dark, a waved paler band on secondaries.
Subapical shade rusty red.....*vau.* Fitch.
Subapical shade brownish-red.*var. ornata*,G.&R.
Colour pale, line on secondaries lost.
Of a pale purplish shade.....*var. bifiria*, H. E.
Pale, almost "sordid white"...*var. astoriæ*,H. E.
Larger, thoracic patch absent.....*inornata*, Neum.
Size small, longitudinal streaks more or less evident.
An obscure thoracic mark.....*strigosa*, Grt.
Without any thoracic mark.....*var. luculenta*, H. E.
Lines comparatively rigid, the basal dislocated on median vein, not toothed.
4th line white on costa.
Subapical patch distinct, yellowish, divided by the veins.....*inclusa*, Hüb.
Subapical patch darker, obscured.....*var. inversa*, Pack.
4th line not white on costa.....*jocosa*, Hy. Edw.

Family SATURNIIDÆ.

Median vein of primaries 3-branched, 8 of secondaries curved, free from base, and remote from subcostal; ♂ antennæ pectinated to the tip, often doubly bipectinated; secondaries with one or two internal veins; size large to very large. Genus AUTOMERIS, Hübn (= ||*Hyperchiria* p., Walk).

A. Io Fabr., *var.* ARGUS, *n. var.*

♂.—Head, thorax, body, legs and wings light yellow. Both wings uniform in colour, with some darker basal tints. On secondaries a prominent blackish-blue ocellus with white central lunule, surrounded by an outer semi-circular black line.

Below a large black discal spot, with white central kernel on primaries, and faint traces of the transverse lines on both wings.

This aberration, which seems extremely rare, is immediately recognized by its immaculate wings, showing only the large ocellus on secondaries.

Caught at Hoboken, N. J.

Family LITHOSIIDÆ.

Genus HYPOPREPIA, Hübn.

H. MINIATA, Kirby, *var.* SUBORNATA, n. var.

♂.—The red colour of thorax, body and primaries of a lighter shade than in the typical form. The black coating on upper surface of abdomen entirely wanting.

Secondaries immaculate, light rose colour, fading towards anal margin, with a faint grayish, apical tinge.

A striking variation, easily determined by the delicate shade of its immaculate secondaries.

Habitat: Texas.

We do not regard *H. miniata* as a synonym or variety of *H. fucosa*, Hübn, but as a valid species. The following table will serve to distinguish the described forms:—

Wings brightly coloured, with three longitudinal mouse-gray bands.
Ground colour of primaries entirely red.
Hind wings with broad mouse-gray border....*miniata*, Kby.
This border lacking.....*var. subornata*, N. and D.
Ground colour partly yellow, partly red.
Bands on primaries normal.....*fucosa*, Hübn.
Bands extensive, predominating and largely obscuring the ground colour.....*var. plumbea*, Hy. Ed.
Ground colour entirely yellowish.....*cadaverosa*, Strk.
Wings obscure gray, thinly scaled, the secondaries pink. *inculta*, Hy. Edw.

Family HEPIALIDÆ.

Genus STHENOPIS, Pack.

S. ARGENTEOMACULATUS, Har., *var.* SEMIAURATUS, *n. var.*

Antennæ light brown. Head, thorax and body, bright salmon colour. Legs pink, tufted with yellowish hair. Ground colour of primaries pinkish salmon. All the maculations, transverse bands, as well as the subterminal space, of a peculiar brownish yellow, which in

fresh specimens has the lustre of pale gold. The two silver dots near origin of cell, in primaries, prominent, varying in shape from subovate to subtriangular.

Secondaries light pink, fading into salmon-coloured tinges along anal margin and in basal area.

Wings below pinkish, veins prominently so, fading into lighter shades in basal areas. Pink subterminal lines.

Habitat: White Mountains of New Hampshire.

This well-known form has never really been described. It figured for decades in collections as *Sth. var. quadriguttatus*, Gr., which latter name, however, is a synonym of the typical insect. The type form, as a generality, is not as large as this variety, of which some specimens measure as much as 85.–90. mm. in expanse.

Described from several examples of both sexes.

HEPIALUS ROSEICAPUT, *nov. sp.*

One ♂. Antennæ light brown.

Front of head and palpi pinkish. Interspace between antennæ red. Prothorax, thorax, body, legs and wings of luteous stone colour.

Primaries with minimal granules of the very faintest pink. Two lines of irregular, blackish dots. One from base along median vein to near centre of cell, where it turns down to internal margin, meeting an oblique transverse line of dots from apex. Subterminal line blackish.

Secondaries blackish gray with luteous fringes.

Below, both wings blackish gray, with luteous costa and fringes. Legs with an outside tinge of pink. A slight anal tuft of the faintest pink.

Expanse of wings: 33 mm.

Length of body: 6 mm.

Habitat: Cascade Range near Lytton, British Columbia.

This insect belongs to the group of small sized, dull coloured Hepialidæ of our western continent. The peculiarity of the pinkish tint of the palpi and parts of the head makes it easily recognizable.

The types of all the new forms here described are in Mr. Neumoegen's collection.

UNIDENTIFIED NAMES.

In going over the literature of the North American Bombyces, we have been unable to apply the following names. A number of them are types of genera of which the original descriptions are inadequate. In-

formation respecting any of them will be most welcome, especially structural notes, to supplement the imperfect descriptions of the authors :–

Pseudalypia Crotchii, Hy. Edw.
Erruca Pertyi, H. S.
Thia extranea, Hy. Edw.
Earias obliquata, Hy. Edw.
Cisthene lactea, Str.
Alexicles aspersa, Grt.
Cingilia humeralis, Walk.
Limacodes (Semyra) Beutenmuelleri, Hy. Edw.
Limacodes (Tortricidia) ferrigera, Walk.
Kronæa minuta, Reak.
Dioptis megæra, Fabr.
Psyche fragmentella, Hy. Edw. (case only).
Psyche coniferella, Hy. Edw. "
Pseudopsyche (Oedonia) exigua, Hy. Edw.
Sapinella (Eutheca) mora, Grt.
Oiketicus Davidsonii, Hy. Edw. (case only).
Chalia Rileyi, Heyl.*
Brachionycha barometrica, Goossens.
Dasychira clandestina, Walk.
Ichthyura apicalis, Walk.
Gluphisia septentrionalis, Walk.
Notodonta plagiata, Walk.
Edema obliqua, Walk.
Edema plagiata, Walk.
Certila flexuosa, Walk.
Saligena personata, Walk.
Heterocampa thyatiroides, Walk.
" mollis, Walk.
" nigrosignata, Walk.
" umbrata, Walk.
Artace albicans, Walk.
Rhagonis bicolor, Walk.
Cossus nanus, Strk.

*This name is not included because we regard the description as inadequate, but because we do not know the species and have seen no reference to it in American literature.

NORTH AMERICAN THYSANURA.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Smynthurus spinatus, n. sp.

Olive. Head tinted with purple, lighter on the sides, olive around the mouth and eyes ; coarsely and sparsely punctuate, punctures light olive, each bearing a white hair. Antennæ purplish, basal joint lighter, as long as the body ; apical segment with from seventeen to twenty subsegments. Abdomen fuscous with lighter spots ; the apical part with an olivaceous cloud, the remainder fuscous with whitish or olivaceous blotches ; on the middle of the back a number of groups of circular white spots, and on the posterior part of each side a row of white spots, varying from four to ten. Underneath olive. Anal papillæ large, distinct, with numerous bristles ; the upper part and the sides purplish or fuscous, the remainder olive with darker spots. Legs long and slender, purplish or fuscous, mottled with variously formed olive or whitish blotches ; apex of the tibiæ and base of the larger claw blackish purple. Claws long and slender, inner claw indistinct ; apex of the tibiæ with a few clubbed hairs. Spring long, broad and flat, reaching the mouth ; second joint broad, each side with a row of long stiff bristles ; bristles twice as long as the spring is broad ; third joint long, broad, bluntly rounded.

Length, 2 mm. (.078 inch).

Habitat : Ithaca, New York.

A very variable species, in young specimens the back is pea-green, and in some specimens there is a broad olive band down the middle of the back. The color varies from pea-green to purplish and fuscous. Collected on the surface of standing water. The species can be easily recognized by the row of stiff hairs on each side of the spring.

Smynthurus floridanus, n. sp.

Black, sides lighter, hairy. Head black, with lighter lines, mouth olive. Antennæ long, slender, as long as the body, basal joint black, remainder olive. Thorax and abdomen with a triangular black spot, the base of the triangle at the apex of the thorax and its apex at the apex of the abdomen. Sides of the abdomen olive mottled with light brown. Underneath olive. Anal papillæ with its front and upper part black, the remainder olive mottled with brown. At the median two-thirds of the back, a stout porrect spine ; spine as broad at base and higher than anal papillæ ; concolorous with the black triangle, except a small olive spot on each side. Legs slender, pale olive ; inner claw two-thirds the length of

outer, stout and blunt. Spring short, slender ; third joint elongate with an apical and two smaller inner teeth.

Length, 1.5 mm. (.058 inch).

Habitat: Florida.

I am indebted to Mr. Nathan Banks for this unique specimen and species. Easily recognized by the abdominal spine, the stout inner claw, and the black dorsal triangle.

The only characters offered by Lubbock, in his Collembola and Thysanura, for separating *Smynthurus* and *Papirius*, is the form of the antennæ and the presence or absence of tracheæ. In my studies of these interesting insects I have found two other characters valuable in separating these genera. These differences may be stated as follows :—

Terminal segment of the antennæ long, ringed ; larger claw unindentate ; apical segment of the spring simple..... *Smynthurus.*

Terminal segment of the antennæ short, with a whorl of hairs ; larger claw bidentate ; apical segment of the spring serrate on the under side..... *Papirius.*

Anoura magna, n. sp.

Body short, broad, one-half as broad as long, finely granulated. Each segment with four dorsal and two lateral globular tubercles, except the last, which is deeply divided, having at its apex two immense globular tubercles. On the anterior part of the anterior margin of each segment another smaller tubercle. From each tubercle there arise from four to eight short, stiff, yellow bristles. On the dorsal part of the head the number of tubercles is the same, but the two median tubercles are placed on the caudal portion of a large quadrangular tubercle, which reaches from between the bases of the antennæ to the caudal part of the head. The ground colour is a light steel blue, with lighter spots between the darker tubercles. Antennæ very short, not reaching the lateral margin of the body by at least a quarter of its width, segments subequal, indistinctly marked. Eyes at the side of the base of the quadrangular tubercle, postantennal organs wanting. Buccal orifice blunt, short and white. Legs short, with a single strong claw.

Length, 5 mm. (.20 inch).

Habitat: Salineville, Ohio.

This species can be recognized by its size, colour, and the globular tubercles; from *gigantea* Tullb., its nearest ally, from Siberia, by the absence of the postantennal organ.

NOMOPHILA NOCTUELLA, SCHIFF.

ORDER LEPIDOPTERA. FAMILY PYRALIDINA.

BY E. P. FELT, CORNELL UNIVERSITY, ITHACA, N. Y.

This is one of the most common insects that flies throughout the summer months. It is also widely distributed; adults have been taken in widely separated parts of Europe, in Algeria, Caffraria, Bengal, Pondicherry, Brazil, and in the eastern and western parts of the United States. Packard writes of the species thus:—"Such cosmopolitan forms give rise to the suspicion that they are relics of a past geologic age, which is borne out by the fact that quite a gap separates it from its nearest allies." In spite of its wide distribution, this insect seems to be one of these common species that has escaped observation, very little having been published on its life history.

On the 15th of last September the writer found among the grass and clover in a pasture several pale greenish larvæ (Fig. 2, b) with black heads and numerous black tubercles. Upon being disturbed they quickly disappear, with a peculiar wriggling, jerking motion, under the grass; they seem to move with equal facility either backward or forward. When not feeding the larvæ can be found under a slight web in the centre of a clump of grass. Later observations show that the larvæ live almost wholly upon clover leaves, eating out the soft parenchyma and leaving the veins; they will eat grass if clover is not within reach, and one larva was observed to seize an Aphid and devour it, though there was plenty of food within reach. J. H. Leach in his "British Pyralids" gives *Polygonum aviculare* (knot grass) as the food-plant in Scotland. As the larvæ become full grown they may be seen wandering around and slowly assembling under chips, stones, etc., where they pupate; when in pastures, dried cow dung seems to be the favourite resort. On the 21st of September both larvæ and pupæ were abundant in these retreats; ten pupæ (Fig. 1, c, d) were taken from a piece of cow dung one-fourth the size of a man's hand. Before pupating the larvæ spin around them a thin, white, loose cocoon.

After remaining in the pupa state about ten days the insects emerge. The adults (Fig. 1, e) are of a sombre brown and a tawny yellow colour, with black markings. They have a peculiar jerky flight, and when disturbed they fly up suddenly about four feet, and usually alight within two rods of where they started. When at rest (Fig. 2, f) they are usually on a leaf with the wings folded flat over the back and the antennæ extend-

ing forwards. Within a few days after emerging the adults pair and oviposition begins. The eggs (Fig. 2, a) are not all laid at once, but are deposited in clusters of from three to ten or more, usually being laid side by side in a row. The period of oviposition probably extends over two weeks or more, as the adults can live seven weeks, though most of them die within a month. One female was dissected; she contained over eighty eggs, which is probably about the average. When first laid the egg-shell is quite soft and readily flattens upon contact with other eggs, or the leaf upon which it is laid, so that it is usually flattened upon several sides to a greater or less degree. At first the egg is a pearly white, but it gradually turns to a slate colour.

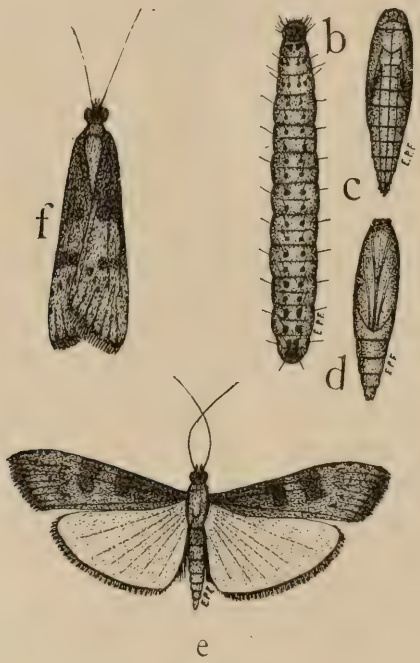


FIG. 1.

Nomophila noctuella: *b*, larva; *c*, pupa (dorsal aspect); *d*, pupa (ventral aspect); *e*, adult; *f*, adult (at rest). (All these figures are twice the natural size.)

The eggs hatch in about ten days, and the larva begins to feed upon the soft parenchyma of the leaf. The young larva has a brownish head and a straw coloured body, the tubercles are very small and the hairs longer proportionally than in the full grown larva. About a week after

hatching the larva moults; the skin ruptures between the head and the cervical shield and also splits a little ways along the back, and through this opening the larva crawls out of its old skin. Just after moulting the head and tubercles are a pale straw colour, later they become darker, and in the last stages of the larva they are almost black. The observed differences between the stages are a gradual increase in the size and depth of colouring of the tubercles, and a decrease in the relative length of the hairs. Before reaching its full growth the larva probably moults five times. In the fall, as the cold weather advances, the larvæ begin to spin nests in the axils of the leaves, where they retire when not feeding and in which grass is allowed to collect and around which the remains of partially devoured leaves are drawn, making a very complete hiding place. Later the nests in the axils of the leaves are deserted and similar nests are constructed upon the surface of the soil. These nests are lined with a thick layer of silk and are covered with a thick coating of particles of soil or bits of dried grass, making a thick, warm nest in which the larvæ pass the winter.

There seem to be three broods a year. In September of 1892 the simultaneous pupation of a large number of larvæ was very noticeable. The pupa state lasted about ten days, the adults emerged, eggs were laid and the larvæ moulted three or four times before cold weather forced them to retire for the winter. These hibernating larvæ come forth in the spring, complete their growth, pupate and the adults probably emerge in the first half of May. The second brood flies in the latter part of June, and the third brood, as already observed, flies the latter part of September. If the adult stage lasts four weeks or more, it would not be strange if the broods overlapped a little, especially the second and third broods, and this is borne out by a reliable record. During the year of 1889 the Entomological Department of the Agricultural Experiment Station, at Ithaca, N.Y., ran six trap lanterns from May 1 to October 20. *Nomophila noctuella* was picked out, the sexes determined and the results tabulated.

TIME OF FLIGHT OF NOMOPHILA NOCTUELLA, 1889.

	MAY.							JUNE.						JULY.													
Date.	5	6	7	8	11	19	20	3	5	16	28	30	1	6	11	15	18	19	20	21	24	25	26	27	31	Totals.
♂	1	3	2	2	1	1	1	1	1	1	1	1	1	1	2	1	2	1	1	1	1	3	3	2	5	40
♀	1																						2	1		4

	AUGUST.																	SEPTEMBER.									
Date.	1	2	3	4	5	6	7	9	15	16	17	18	21	23	24	25	26	29	4	6	8	18	19	21	25	29	30	Totals.
♂	2	3	1	3	4	0	2	3	1	1	1	0	1	1	2	1	1	1	2	1	1	0	1	0	1	1	1	36
♀					2	4		2	1			2										2	2	1			1	17

This table shows that the adults fly in greater or less numbers from May to the last of September. From May 20th to June 3rd none were taken, which pretty sharply defines the first brood. And, as might be expected, the second and third broods are separated by no such distinct line, and yet there is an indication of two later broods, though the table would seem to indicate that those taken in September might be the last of the second brood and not individuals of a third brood, which is contrary to observed facts. For during the last year a trap lantern was run with practically the same results as were obtained in 1889, but a third brood was observed to emerge in large numbers after September 20th. Probably the cool evenings prevented many moths from flying at night, and consequently from being taken in the trap lanterns.

Preventive Methods.—The above table shows that four-fifths of moths taken are males. If we assume that there are enough males left to fertilize the females, which is quite probable, the trap lanterns are almost useless as a means to check the increase of this insect, because the females escape, oviposit, and thus provide for the propagation of the species. As the larvæ and the adults incline to remain near one place, it is possible to materially reduce their numbers on limited areas. In large fields where plowing is not objectionable, many might be destroyed by thorough plowing in the latter part of November, after the larvæ have retired for the winter. Should this insect become very destructive in the summer, deep plowing in the middle of July, followed by harrowing, might destroy many pupæ. On lawns and other small areas advantage might be taken of the larva's habit of retiring under chips, etc., to pupate. If chips, etc., be placed on the lawn and firmly pressed down in the middle of July or of September, and allowed to remain a week and then collected and burned, many pupæ will be destroyed.

Technical Descriptions.

Egg (Fig. 2, a), pearly white when first laid, changing to a glistening slate colour within a few days. Shell finely reticulated; egg usually flattened upon several sides. Size, .69 mm. by .32 mm.

Larva (first stage), head diameter, .25 mm.; body, diameter, .15 mm.;

length, 1.05 mm. Clypeus, labrum and thoracic shield a tawny olive colour; head a seal brown; body a sordid straw colour. The tubercles proportionately smaller and the hairs longer than in the full grown larva.

Larva (Fig. 1, b), (last stage) length, 2 cm.; head, diameter, .32 mm. body, diameter, 3.7 mm. Head and thoracic shield black; scattering hairs occur on the head. Dorsal surface of body pale green with black tubercles. There are four tubercles on each side of the third and fourth segments, three in a row extending ventro cephalad and the fourth caudad of the last one in the row. The dorsum of the remaining segments i

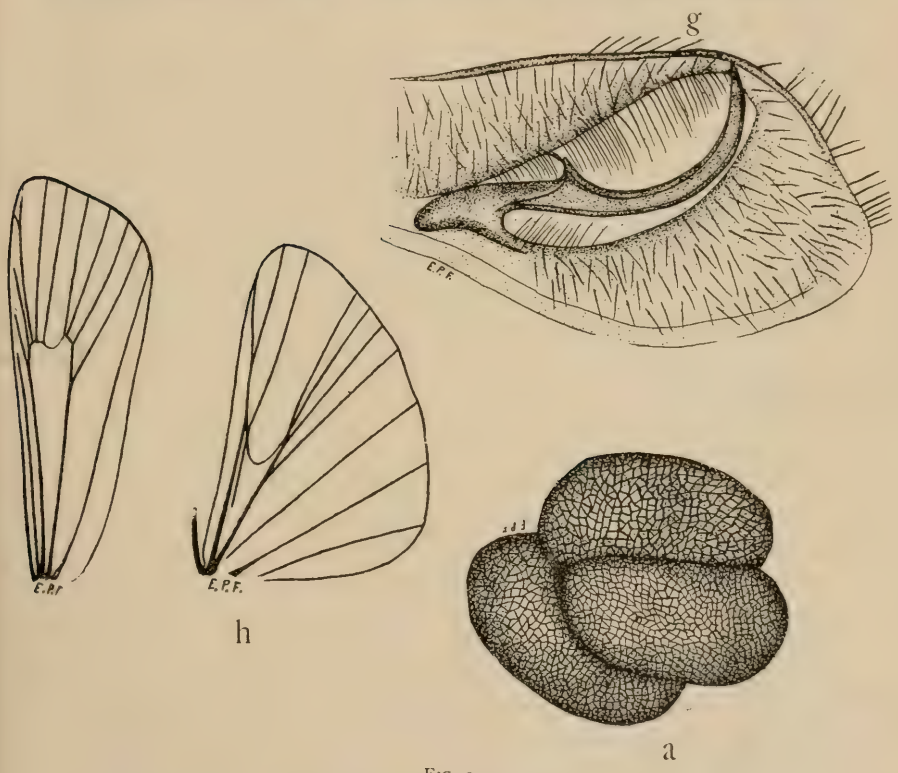


FIG. 2.

Nomophila noctuella: *a*, eggs, x 40; *g*, male genitalia (mesal aspect of right harpe and clasper), x 80; *h*, venation of wings, female, x 4.

divided by a slight transverse constriction into a cephalic and caudal part; the cephalic part of each segment bears three tubercles in a row, extending ventrad and forming with the tubercles of the third and fourth

segments a lateral, a super and a sub-stigmatal row of tubercles; the caudal part of each segment bears one tubercle, which is in the lateral row. The tubercles in the lateral rows on the thirteenth segment coalesce mesally. One or more hairs grow from each tubercle. Ventral surface sordid white with brownish tubercles. On the ventral surface there is a lateral row of brownish lunate tubercles, and on those segments not bearing legs there are transverse rows of four tubercles, those laterad being the larger. True legs brown with blackish tips. Five pairs of prolegs, occurring upon the seventh to the tenth and thirteenth segments inclusive. Prolegs short with brownish tips.

Pupa (Fig. 1, c, d), length 13 mm.; 3 mm. across the thorax. General colour light brown, venter lighter. Eyes prominent and usually dark coloured. The cephalic part of the pupal case is divided by sutures. Several of these unite at the base of the wing covers, where the chitine is thickened, darker coloured and pushed out into minute ear-like processes, which appear like dark spots. On the dorsum of the abdominal segments there are three dark stripes, extending from the thorax to the tip of the abdomen; one on the meson and the others, one on each side, just mesad of the spiracles. Abdominal sutures darker, darkest on the dorsum. Spiracles dark brown.

Adult (Fig. 1, e, f).

Male Genitalia.

Harpe (Fig. 2, g), membraneous; size 1.55 mm. by .81 mm.; mesal surface concave.

Clasper (Fig. 2, g), chitinous; fulvo-ferruginous; sickel-shaped.

Venation of wings (Fig. 2, h). Frenulum of ♂ a single spine, of ♀ two spines.

Bibliography:—1776, Schiffermiller, S. V. (Orig. Des.) Syst. Verz. Schmet. der Widner. (Schiff. & Dennis), Wien, p. 136; 1776. Herrich-Schäfer, Syst. Bearb. Schmet. von Europa, IV., p. 42; 1826, Duponchel, P. A. Hist. Nat. Lepid., VIII., 220–3; 1829, Treitschke, F. Schmet. von Europa, VII., 109; 1833, Wood, W., Index Ent., 1476; 1835, Treitschke, ibid, X., 23; 1854, Guenee, A. Delt. et Pyralites, 414, Paris; 1859, Heinemann, H. D., Schmet. Deut. und Schweig, 91; 1871, Staudinger-Wock, Cat., p. 212; 1872, Packard, A. S., Ann. Lyc. Nat. Hist., N.Y., X., p. 258–260; 1874, Berg, C. *(hybridalis)* Bol. Acad. nac. Ciencias Uni., Cordova; 1876, Snellen, P. C. T., Nat. Tijd. Neder., India; 1886, Leech, J. H, Brit. Pyralids, p. 21. Larva described and adult figured, Pl. VII., Fig. 2.)

FURTHER ON THE DIPTERA CONSIDERED AS THE HIGHEST INSECTS.

BY C. H. TYLER TOWNSEND, LAS CRUCES, NEW MEXICO.

In my article in CANADIAN ENTOMOLOGIST, 1893, pp. 7-8, as also in my previous note in *Science*, Vol. XIX., 1882, p. 320, I stated that Hyatt and Arms were the first to point out that the Diptera were the most highly specialized insects, and consequently to be considered the highest in rank. It should be noted, however, that the same idea was advanced at the same time by the renowned insect anatomist, Mr. B. T. Lowne, well known for his work on the anatomy, etc., of the blow-fly. In part I. of this work, Oct., 1890, p. 25, Lowne says:—"The blow-flies belong to the family *Muscidæ*, one of the most highly specialized groups of the Diptera, the most highly specialized order of the class Insecta."

On pp. 26-7, he further says:—"Just as all discussion would be futile as to whether a bird or a mammal is the higher type, so it is useless to consider whether the Diptera or the Hymenoptera have the higher organization; but there can be no question as to which of these orders departs most from the more generalized form. The Diptera are far more remarkable in their developmental history, and in the modification of structure which they present in the adult or imago form. In this relation the strong tendency of many to produce their young alive, and the fact that some have a capacious matrix, or uterus, in which the larvæ are hatched, or even attain the pupa form, before birth, is not without interest, presenting as it does some analogy with the viviparous character of the mammalia amongst vertebrates—whilst the nest-building instincts are more manifest in Hymenoptera and in birds. [This is an important analogy, and well pointed out.—C. H. T. T.] It is true that the flies, and more especially the heavy forms, with a comparatively tardy flight, like the blow-fly, have been regarded as 'stupid'—Sprengel called them 'die dummen Fliegen'—and do not excite our sympathy and curiosity to the same extent as the social Hymenoptera; but it is impossible to judge of the intellectual functions of an insect. The manner in which the blow-flies and their near allies, the house-flies, have made themselves at home

with man, speaks for their power of adapting themselves to new and varied conditions. They are cunning, wary, and easily alarmed, and, except when benumbed with cold or heavy with eggs, know well how to avoid danger. They appear to me far more clever in this respect than the bees and wasps."

My article in the CAN. ENT. was written before I saw the above quoted passages in Lowne's work. In his first edition of the anatomy of the blow-fly (1870), Lowne does not advance any ideas with regard to the systematic position of the Diptera.

The real credit for the original discovery and correct interpretation of the extreme specialization of the Diptera belongs to Weismann, who published a paper upon the development of the Muscidæ,* in 1864. Later, in 1876, Ganin sustained in the main the investigations of Weismann. Lowne first presented these views in English, at least in the Old Country, while Hyatt and Arms were the first to call attention to them in America.

The consensus of facts bears out the statement that the Diptera are the most highly specialized, and therefore the most highly organized order of insects. While they possess ancient as well as recent forms, they have, in the muscid families, reached a higher plane of development than any group in any other order. It is by no means contended that the Nemocerous Diptera are as highly organized as some groups in other orders, since they comprise the most ancient living forms of Diptera.

The Diptera probably find their culmination in the Tachinidæ, and of this family doubtless the Phasiidæ stand first. *Trichopoda*, *Phasia*, and *Hyalomyia* may therefore be considered as probably representing the highest forms of insect life.

ROYAL SOCIETY OF CANADA.

The next annual meeting of the Royal Society of Canada will be held in the City of Ottawa, on the 23rd, 24th and 25th of May. The Society will be represented by Mr. Hague Harrington, our Vice-President. We notice by the programme that Mr. Harrington is to read a paper on Canadian Uroceridæ, a subject to which he has given much attention.

*Die nachembryonale Entwicklung der Musciden nach Beobachtungen an *Musca vomitoria* und *Sarcophaga carnaria*. Zeit. f. Wiss. Zool, XIV., 187 (1864).

Mailed May 18th.

LIBRARY
ON SCIENCES

The Canadian Entomologist.

VOL. XXV. LONDON, JUNE, 1893. No. 6.

NOTES ON CHIONOBAS SUBHYALINA, CURTIS.

BY WM. H. EDWARDS, COALBURGH, WEST VA.

This species has long been lost sight of. It was described nearly sixty years ago from a single male "in good condition". I never have heard of its forming part of any collection excpet that of the British Museum, and my own, and my specimens—a male and a female—were sent me from the Museum more than twenty years ago. In his Catalogue of the Satyridæ, 1868, Mr. Butler says of this species: "We do not possess the type, but our specimens agree exactly with Mr. Curtis's description." Of my two specimens, the female was broken and the wings rubbed so that they were worthless for characterization, but the male is in fair condition. It does not agree with the description in some points. Thus, there are not "two indistinct white dots towards the apex with black ocelli"; and the surface of the under forewing cannot be called "mottled with ochre and pale black, lightest at apex", but the scales are abraded where the mottling should be. The description goes on: "inferior wings spotted and mottled with black and dirty white, forming a waved and curved pale line beyond the middle, with three or four whitish dots beyond it." My male has a slight and pale mesial band "waved" (or crenated) "and curved"; and if the dots beyond it may mean dots on the hind margin, the description will answer. The wings are described as semi-transparent, and this male is so to an unusual degree.

I have had for three years a single male taken by Mr. Bean at Laggan, which in some points agreed with the description of *Subhyalina*, but failed in others. There were no apical dots, no mesial band, and no whitish dots. Instead of the band there is a discoloration in patches, especially on the two margins, where the band would be. Therefore, I have been uncertain as to the position of this individual. But I have recently received two males from Mr. Fletcher, and six males and one female from Mr. Neumoegen, all taken by Mr. Bean at Laggan, kindly loaned me for examination, and this new material makes it certain that

the species is *Subhyalina*. All these examples are remarkably transparent, and on the disk of forewings beneath there is almost a total absence of dark or mottled scales. But, at the apices there is decided mottling, the light colour prevailing. Some, however, have fine brown scales in the upper interspaces as well as over the cell. One male has two light subapical dots on upper side, though without black centres, the others show no trace of these. On the under side of the hind wing all these examples agree with the description, and are spotted and mottled with black and dirty white. In respect to the band there is extreme variation, some being quite unbanded, though in these the disk is more or less clouded darker; others have a pale band. One male and the female show an indistinct outer edge of the band, which answers to the description, "a waved and curved pale line"; and two males present the band clearly defined on the posterior side, and nearly so on the basal; but the band is, after all, scarcely more than a shadow, nothing so distinct as is usual in the allied species. As to whitish dots on the margins, three males and one female have them, the rest do not.

Mr. Butler gives "Arctic America" as the locality of this species, but I know of no other than Laggan.

I shall give a plate in Butt. N. A. to Subhyalina presently.

ADDENDUM.

After I had sent the foregoing lines to the editor I received two more females of the species treated of, from Dr. Skinner, from Laggan like the rest. One of these in no way seems to differ from the female before described; but the other varies in that half way between the outer edge of the band and the margin, on four interspaces, in the middle of each—the lower subcostal to second median, is a small whitish spot, clearly defined on the two lower interspaces, diffused on the others. This character agrees completely with the description by Curtis as to "three or four whitish dots beyond" the middle of the wing. I find therefore in one or other of the twelve examples viewed, every one of Curtis's characters except black points in the apical spots. But in only one of the twelve is there any appearance of apical dots on upper surface and in only one whitish dots beyond the band. The same female which offers the dots beyond the middle differs from the other eleven, in having a row of whitish dots on the corresponding interspaces of the forewing, two fifths the distance from the margin to apex of the cell, in a straight line, not parallel therefore to the margin. All three of these

females have the band undefined, cloudy. I see that occasionally in a dark *Semidea*, white spots are present in similar position on the under hind wing to that of this last-mentioned female *Subhyalina*.

FIELD NOTES FROM TEXAS AND LOUISIANA.

BY H. F. WICKHAM, IOWA CITY, IOWA.

In the summer of 1892 I spent a month on the line of the Southern Pacific R. R., between Morgan City, Louisiana, and San Antonio, Texas. While the collecting was by no means of the best, a few notes may interest the readers of the CANADIAN ENTOMOLOGIST and give some idea of insect life in the Southern States during the hot months.

Morgan City lies to the west of New Orleans on the Atchafalaya River, in a country so flat that, as the natives say, "Water will only run as far as you dig a ditch for it." The neighbourhood is covered in great part by heavy woods, with a rank underbrush of poison oak, trumpet creeper and palmetto, the ground beneath all being, at the time of my visit, soaked with rains and dotted with innumerable pools of water in which mosquitoes were freely breeding. Along the edge of the woods I had to do the most of the collecting, as I found it quite an impossibility to brave the attacks of the mosquitoes and Tabanidæ in the depth of the forest.

The palmetto proved to be the plant best worth hunting over, and when I arrived on the twenty-second of June it was in bloom, or just going out in some cases. Where the flowers were fresh and sweet there were numbers of *Euphoria sepulchralis* and *Trichius delta*, the latter the less numerous and very hard to capture in the bright sunshine, though when cloudy weather prevailed they were much more sluggish. *Chauliognathus marginatus* occurred on the flowers in numbers, but it was not considered worth while to take many of them, as it appears to be common from Pennsylvania south, though I never take it in Iowa. *Paria canella* occurred once in a while, and a single specimen of *Phyton pallidum* was also shaken into my umbrella. When the flowers had fallen off, disclosing the newly-formed fruit, I found a very nice Curculionid beetle, *Pachybaris porosus*, which was known previously from Florida. It seemed not to occur on the plants except where the flowers had commenced to drop off, and quite likely oviposits on the newly-formed fruit. Wherever an open patch allowed a chance for growth of wild sunflowers, there were a good many beetles of other kinds—*Mecas inornata*, *Systena*,

sp., and a *Baris*, which seems to be new. A Solanum yielded a few specimens of an *Anthonomus* and a very small specimen of *Trichobaris trinotata*, a species which has proved in places a very serious pest to the potato. By scratching away dead leaves in a thicket a few *Lachnosterna ephelida* were secured, and a few also of *Anisodactylus maculicornis*. A rotten log, on being broken, disclosed an example of *Chlænius fuscicornis;* another contained several specimens of *Passalus cornutus*, with its larva. An ant's nest held, besides the legitimate inhabitants, a number of the curious little *Limulodes paradoxus*, which I have found with ants from Iowa to Arizona. Dry fungus was full of *Enneartbron*, and in it I found also a specimen of *Euplectus linearis*.

At night, around the light, I added still a few species to my collecting botties—*Hippodamia parenthesis*, *Atænius figurator*, *Cyclocephala immaculata* and *Lachnosterna ephelida*, but insects were not by any means as common as I had expected them to be, so on the twenty-sixth I left for Houston, Texas.

The next afternoon, arrived at Houston, I found inside of the city limits great numbers of a beautiful weevil, *Eudiagogus pulcher*, which has a curious habit in lieu of dropping off the food-plant, as is usual with most Rhynchophora when disturbed. It feeds on the leaves of the coffee-weed, and usually remains on the upper surface of the leaf while eating in plain sight. If disturbed, it whirls quickly around to the under surface of the leaf, and either remains clinging there or runs rapidly down the stem of the plant towards the ground, keeping to the under side, so as to be invisible from above. With it I found associated *Anomœa laticlavia* and *Neoclytus erythrocephalus*.

Along the sides of the track, where the vegetation was rank, I got a few beautiful specimens of *Œdionychis* and a few of *Paria viridicyanea*. Under a stone occurred several *Psammodius nanus* in burrows which they had made just at the surface of the ground, much as some Scolytidæ bore in bark. A stump covered with fungi was next investigated and proved quite a rich find, yielding *Platydema* of two or three species, *Hoplocephala bicornis*, *Tritoma erythrocephala*, *T. angulata* and *T. atriventris*, besides several examples of the pretty little *Formicomus scitulus*, which seemed not to live on the fungi, but on the ground near them.

The woods themselves yielded beetles of a different sort. Beating branches of lately cut pine trees was productive of a number of *Drasterius amabalis*, a few *Silvanus rectus*, and a few other things. A little *Mono-*

hammus of the form called *minor* was taken, also a *Buprestis* and a *Chalcophora*. Where a live oak was being cut up I found *Chrysobothris femorata* var. *Alabamæ* and *Neoclytus scutellaris* running over the branches, but they were wild and difficult of capture. A large fungus was found to be often infested by *Pocadius helvolus* and a smaller one by *Pallodes silaceus*. Of these latter, when the fungus was small only one or two specimens were found in it, but larger fungi yielded more beetles. Five or six specimens of *Octotoma plicatula* were taken on leaves, and looked very little like living things when at rest.

Washing the banks of a stream brought very little to light, except a few specimens of *Tachys* and a very small *Heterocerus*; water-beetles were almost entirely absent. One incident of interest was noticed here, however, when a little *Tettix* (I use the generic name in the old, wide sense) was disturbed and jumped into the water, alighting on a stick that was completely submerged to the depth of about an inch, and rested there until I captured it. This brings to mind a note of Mr. Roberts in "Entomologica Americana," where he states that he found *Stenus* on masses of frogs' eggs which were completely submerged.

Collecting on weeds along the edges of woods and in open patches disclosed a number of *Conotrachelus leucophæatus* in the heads of a plant with milky sap, and with them occurred large numbers of *Aphthona texana*, a little jumping beetle of rather slow movements. I took all of them with my fingers without great trouble. *Henous confertus* runs around in grassy places during the morning and evening, having apparently the same habits in this respect as many of its wingless relations.

A day was spent in making a side-trip to Galveston to get in sea-shore collecting. The beach was alive with *Cicindela saulcyi*, but the only other Coleoptera there were *Phaleria* sp., and an Oedemerid, probably an *Asclera*. Farther back, out of reach of the tides and salt spray, I got a great number of *Haltica punctipennis* which was swarming on some low weeds.

Columbus was reached on the morning of July fifth, and work commenced at once. Though only a few hours ride from Houston, it is in quite a different looking piece of country. The valley of the Colorado here is wooded with deciduous trees, the pine having disappeared, and the better drainage is apparent from the nature of the soil. This spot was made historic in the annals of Entomology by the labours of Mr.

Schwarz, and the papers of Drs. Leconte and Horn of a few years back are full of allusions to species collected there by him. I hoped to find it an interesting field, and was not disappointed.

Most of the work was done along the river bottom, where the cottonwood timber was usually sufficiently free from underbrush to admit of freedom of movement and of sight. The felled trees, when the bark was peeled off, furnished *Toxidium compressum*, *Litargus balteatus*, *Epierus regularis* and *Bacanius punctiformis*. Beneath the old trunks were found *Blapstinus fortis* and *arenarius*. The cow-droppings were productive of *Copris carolina*, *Phanæus triangularis*, *Onthophagus pennsylvanicus*, *Aphodius tenuistriatus* and *stercorosus* and *Cercyon variegatum*. The banks of the river were covered with *Cicindela rectilatera* and *C. sperata; Tetragonoderus fasciatus* and *T. latipennis*, the latter abundant, were to be obtained in more circumscribed spots with a species of *Stenus* near *stygicus*. The weeds on the bars, on being pulled up, were found to shelter around their roots a colony of *Agonoderus comma*, *Anthicus difficilis*, *A. nanus*, *Metachroma interrupta* and *Myochrous denticollis*. This *Myochrous* was also often found feeding on willows.

On leaving the immediate vicinity of the river and working along the roads, *Languria læta* is found commonly with *Acylomus calcaratus* and *Conotrachelus leucophæatus*. Arriving at a point where a little creek crossed the road, I ascended it, and where a tree had been felled across it some years ago and was consequently in a rather advanced stage of decay, settled down for an hour or two of solid work. By peeling off the bark carefully I was able to get everything worth taking, as whatever was nimble enough to escape my bottle at first, fell into the water and was easily secured. The results were two *Mallodon dasystomus*, several *Eupsalis minuta*, *Platydema ruficorne*, *flavipes*, *lævipes*, *Eustrophus bicolor*, and several other things. Leaving this spot and going on to a freshly cut mesquit, I got under the loose bark four or five specimens of *Conotrachelus anaglypticus*, a few *Carpophilus semitectus*. and some *Laemophlœus chæmeropis*. Under damp logs I found the specimens of larvæ, pupæ and imagines of *Epipocus* described in another paper.

After a week's stay at Columbus I moved on to Harwood, which is at a considerably higher altitude—here the cottonwoods were gone and replaced by mesquit and oak, much of it "scrub." The collecting was not nearly so good and of a different character, *Eleodes tricostata* being one of the most prominent beetles. Two or three *Pasimachus* were found under

logs, also a pair of *Romaleum atomarium* and a large *Mallodon serrulatus*. *Acmæodera pulchella* var. *mixta* and *Bruchus amicus* occurred on flowers. The leguminose trees and shrubs yielded, by beating, *Cryptocephalus defectus*, *Epicauta nigritarsis* and *Coleocerus marmoratus*, while under the bark and in the wood of dead trunks and branches I took a number of *Phlœonemus catenulatus* and *Trogoxylon*, sp , besides a fine *Amphicerus*. The dead wood was full of cerambycid larvæ.

The next stop was made at Luling, in the San Marcos Valley, a spot which pleased me more than any other in Texas. The river bottom is heavily wooded in places, and the holes and cracks in the great trees were the hiding places of beetles of large size and great beauty. The fine *Zopherus haldemanni* was taken here in some numbers, sometimes resting on the surface of logs which were lying on the ground, or, just as often, climbing on the trunks of trees seven or eight feet up. Besides these I got a large *Mallodon*, two *Alaus lusciosus* and a number of *Strategus julianus*, the last nearly all dead but in perfect order—sometimes not yet stiffened. They occurred in holes where trees had been torn up by the roots, or often simply lying on the ground without cover or protection of any sort. *Photuris pennsylvanica* was found very commonly in one spot, clinging to the trunks of trees close to the ground, while three or four *Chlœnius orbus* were taken beneath logs in damp places. A pair of *Canthon cyanellus* were detected in the act of inspecting a dead clam on the river bank and were promptly "run in."

The weeds along the roads were full of a species of *Chrysomela*, for which I can get no name. The great compositæ by the edges of the cotton-fields furnished numerous *Lixus laesicollis*, *Smicronyx obtectus*, *Pachytychius amoenus*, and some other weevils.

San Antonio did not prove to be in as good a locality for beetles, and only in a few favoured spots could anything be found. Beating along the track of one of the lines of railroad proved more productive tnan anything else, and in this way I obtained a number of *Cryptocephalus defectus*, *Coccinella abdominalis*, *Epicauta nigritarsis*, and a little Galerucid not yet described. The banks of the river, close to the source, yielded *Ega sallei*, *Oodes* sp., *Ochthebius foveicollis*, and *Limnichus lutrochinus*, with several other things; but the great haul of the season was a lot of several dozen assorted ticks, which I collected on my own person after sitting on a stone in the woods for a few moments to eat my lunch.

A NEW GASTROPACHA.

BY J. J. RIVERS, UNIVERSITY OF CALIFORNIA, BERKELEY, CAL.

Phyllodesma Dyari, n. sp.—General appearance of the palest sienna or yellowish-ochre. Thorax and patagia thickly clothed with short hair of a uniform pale tone, the abdominal covering similar, but longer and finer, which gives to it a slightly silky appearance.

♂. Anterior wings with the anal angle deeply emarginate; three lines of dusky spots cross the disc ending near the costa, these being lines rather than bands. There are in some examples two dusky spots, one more conspicuous than the other, in the discal space. From the hind margin up to the middle line of spots, and extending to the apex of the wing, the area is of a rosy or peach-brown; the remainder of the wing being paler and colder in tone, in fact ochry-yellowish.

Posterior wings with the usual deep emargination on the costa. From just above the anal angle, a pale and rather wide band runs across towards the outer margin; this pale band widens on the inner margin when in contact with the abdomen, and this part of the wing is clothed with the same long filament-like hairs as the abdomen.

Fringes of all the wings rusty and white in separate rows of scales, the basal row being rusty and running out and covering the points of the nervules, while the white scales are seen only in the hollows of the crenations.

Beneath, pale rosy-brown, a darker central band traverses all the wings, beginning near the costal edge of the forewings, and finishing short of the anal angle of the hind wings. There appears on some specimens only, a short second band, when the ground colour between them is whitish. In the central area bordering the emargination of the hind wings is a wide patch of rusty brown.

♀. General appearance much paler than in the other sex, being very pale creamy or ochry-yellow. Margins of all the wings crenate; strongest on the hind margin of the posterior wings and decreasing in boldness towards the apex of the anterior wings. There are faint lines of spots on the disc of the forewings, suggestive of bands, and on the hind wings the only variation of the same pale expression of the whole insect is a broad, well-defined band of a lighter colour, that crosses the wing from above the anal angle.

Beneath uniformly pale ochry-brown, with a large attendant patch, conspicuously darker, in the immediate region of the emargination of the hinder wings.

Expanse of wings, ♂, 1.55–1.80 inches; ♀, 2.25 inches.

Habitat: El Paso, Texas.

THE BUTTERFLIES OF LAGGAN, N. W. T.; ACCOUNT OF CERTAIN SPECIES INHABITING THE ROCKY MOUNTAINS IN LATITUDE 51° 25′.

BY THOMAS E. BEAN, LAGGAN, ALBERTA.

(*Continued from page 132, Vol. 22.*)

ELEVATIONS IN VICINITY OF LAGGAN.—Altitudes near Laggan have in some cases been very incorrectly stated. In "Appleton's Canadian Guide-Book; Western Canada," published 1892, the altitude of Louise Lake (Emerald Lake of the Geological Survey) is given as one thousand feet above Laggan, and the elevation of Agnes Lake is stated at three thousand five hundred feet above Laggan. Such statistics are worse than useless.

The elevation of the Canadian Pacific Railway at Laggan, by latest profiles, is five thousand and eight feet. Emerald Lake is five hundred to six hundred feet higher—its elevation can hardly exceed five thousand six hundred feet. Agnes Lake is about two hundred feet below the normal timber-line, so that its altitude is not far from six thousand eight hundred feet; it is eighteen hundred feet above Laggan, and pretty ac curately twelve hundred feet higher than Emerald Lake.

According to the Geological Survey Reports, timber-line on the mountains around Laggan occurs at about seven thousand feet. This elevation compares with an altitude in Colorado of something over eleven thousand feet. Gannett's "Dictionary of Altitudes" gives U. S. Survey estimates of 31 timber-lines in Colorado, of which 29 are above eleven thousand feet.

CARTEROCEPHALUS PALÆMON, Pallas.

Paniscus, Fabricius.

Mandan, Edw.

Material of *Mandan* examined:—1 ♂ from Nepigon (Mr. Fletcher); 36 local ♂s, some imperfect, but nearly all bright and readable; 1 ♂, 1 ♀ from Banff (Mr. H. K. Burrison); 12 local ♀s, all being legible, and 8 of them bright and fine. Examples of *Palæmon* compared:—4 ♂s, 2 ♀s from Germany; 2 ♂s, 1 ♀ from Zurich, Switzerland; 2 ♂s from northern Finland.

This examination was undertaken because from frequently repeated comparisons of the Bow Valley *Mandan* with *Palæmon* the essential agreement of the two had become evident. Until this final study was

made, I had thought *Mandan* of New England and eastern Canada might be distinct not only from *Palæmon* of Europe, but also from *Mandan* of the Bow Valley. That idea I can no longer entertain. The amount of variation among my few instances of *Palæmon* proves to be greater than I have hitherto considered it, and this fact lessons the probability that the name *Mandan* covers two species. My reasoning is:—(1) The European *Palæmon* is so uniform in size and colour, and presents its variations in a manner so undemonstrative, that the true values of its variations are easily recognized, and it is readily seen that the several variational phases constitute but a single species. (2) *Mandan*, like many other of our lepidoptera, is strongly influenced by the meteorological peculiarities of widely separated districts inhabited by it in North America, and in certain extreme conditions displays its variational capacity with a freedom, an exuberance, quite in contrast to the conservative variation of species in Europe. (3) As I find the variation in *Palæmon* essentially as important as the more emergent and erratic variation shown in certain environments by *Mandan*, and as *Palæmon* in its various attitudes is inseparable from corresponding aspects of *Mandan* and helps to render evident the unity of *Mandan's* extreme phases, I am therefore led to believe *Mandan* contains but one species, although it has been so well supplied with synonyms and its extremes of colour variation are so great.

In the material at hand, together with the *Mandan* literature accessible, I find no indication of more than one species, unless it be the difference in food-plants—The Nepigon and Bow Valley sections eating grasses, while *Palæmon* of Europe is said to feed on *Plantago major*. This diversity does not greatly impress me, as the "unexpected" in that line often happens. After discovering (Aug. 5, 1889) that *Colias nastes* eats Willow, and having (in August, 1890) persuaded *Grapta zephyrus* to accept a diet of rose, I am prepared for almost any specialty in food-plants. *Melitæa anicia* feeds on two species of plants, or more; so does *Lycæna aquilo*.

From the insects compared I have the following information. The Banff specimens agree with the Laggan series. The Nepigon ♂ is almost a copy of one Finland ♂—if smaller, the difference is very slight; it differs above forewing in having the median yellow-brown spots shorter (partly obliterate); on under side the Finland example is more suffused with yellow and the spots under hind wing are less clear; in every

essential character the two insects are alike. The Bow Valley material has been determined as *Mandan*. If it is *Mandan*, then *a fortiori* it is also *Palæmon*, for it is closer to *Palæmon* of Germany than to the *Mandan* of eastern North America Arranging the entire series according to affinity of variation, the Nepigon specimen goes to one extreme, next in order follow the two Finland *Palæmon*, then two of the *Palæmon* from Germany, and a number of the Bow Valley *Mandan*. Nearly all the remaining Bow Valley *Mandan* range still further away by an increasing size and boldness (conspicuousness) of the fulvous spots above primary, these spots being in some specimens so enlarged as to replace almost entirely the dark brown of general surface. The two *Palæmon* ♂ s from Switzerland, two of the German *Palæmon* and a small section of the Bow Valley *Mandan* ♂ s follow a line of variation somewhat diverse from what is seen in the major part of the series, but without special bearing on the main question, except as further illustrating the fact that *Mandan* is more ready to break ranks than is consistent with due respect to "the authorities." In one particular, all the North Americans examined are alike—the spots under hind wing are clear in colour and distinctly in contrast to the ground colour. Part of the Europeans agree with the North American specimens in this, and the others have the spots suffused with dull yellow as in *Carterocephalus silvius*. The description of *Mandan* in Fernald's "Butterflies of Maine," indicates that the Maine *Mandan* is practically like that of Nepigon, and that the spots below hind wing are clear in colour; the description in general covers *Palæmon* equally with *Mandan*. Mr.W. H. Edwards, in his description of *Stereoptes skada*, mentions that the spots below hind wing, except the outer rows, were of a yellowish tint. Mr. S. H. Scudder describes the spots beneath hind wing of *Hesperia mesapano* as "very large silvery white spots"; in the Laggan specimens the colour is a pale buff, scarcely white in any.

Mandan in the greater part of its range seems to be extremely rare. A few captures have been recorded, made in New England and at various localities in the Province of Quebec, with one or more in Alaska and Labrador. It appears to have been found in frequency only in two districts—the region between Hudson Bay and Lake Superior, and the Bow Valley. Mr. James Fletcher's records for Nepigon are well known. Mr. J. Jenner Weir, in THE ENTOMOLOGIST, writing of lepidoptera collected chiefly at Moose, on south coast of Hudson Bay, makes this record :—

"*Heteropterus mandan*, Edw.— Much resembles *H. paniscus*, Fab.; common in 1883, but not observed before."

A specimen of *Mandan* was in 1872 determined by Mr. H. K. Morrison as *Paniscus (Palæmon)*. In an account of lepidoptera collected on Anticosti, Mr. William Couper writes:—"*Hesperia paniscus*, Fabr.—A single specimen captured at Fox Bay, Anticosti, on the 26th June. It was sent to Mr. Morrison, who informs me that it does not differ in the slightest from the European specimens of *paniscus*. It is close to *Mandan*, Edw."—(CAN. ENT., Nov., 1872.) At that time *Mandan* was excessively rare in collections.

Carterocephalus palæmon of the Bow Valley is larger than the same species in Europe and eastern North America, and is more variable in size, ranging from expanse of the Finland and Switzerland instances to a size noticeably exceeding that of the German examples. It displays greater individual variation also as to size and colour of the fulvous spots above forewing. At Laggan it chiefly frequents grassy meadows along the Bow at an altitude of 4,800 to 5,000 feet, the ♂ in ordinary seasons appearing early in June and the ♀ during last half of the month. Several ♀s have been taken at Emerald Lake in early July, and 1 ♀ at Agnes Lake early in August. It occurs also at Stephen, B. C., six miles west of Laggan.

This is one of those species which come from pupa earlier or later according to the forwardness or tardiness of the season; it is by no means so prompt to a date as are some of the local butterflies. There is no indication of more than one flight in a season.

ADDITIONAL NOTE ON THE LARVA OF PALÆMON.

After sending away the foregoing, a very interesting article was me, with in *The Entomologist* (London, England), Oct. and Nov., 1892, which tends to confirm my views already stated:—"Life History of *Carterocephalus Palæmon*, by F. W. Frohawk, F E.S." So far as I can judge Mr. Frohawk's account of the larva of *Palæmon* agrees substantially with the description of the larva of *Mandan* published by Mr. James Fletcher in CANADIAN ENTOMOLOGIST, June, 1889. My main object in the present reference is to mention that *Palæmon*, as well as *Mandan*, eats grasses. Mr. Frohawk reared his larvæ with success on *Bromus asper*.

My own incomplete notes of the local larva, from observations made in June, 1889, agree entirely with Mr. Frohawk's account. An interesting fact in my experiment was that several of the eggs were laid by lamp

light at eleven o'clock one night. The young larva emerges near apex of egg, and usually eats little, if any more of the shell than sufficient to allow of his exit. The larvæ fed on grass.

I make no citations from Mr. Frohawk's article. It should be read entire by all interested in the subject.

ADDITIONS TO THE LIST OF CANADIAN LEPIDOPTERA.

BY J. ALSTON MOFFAT, LONDON. ONT.

During the years 1891 and 1892, I have received the following names new to the Canadian list. Some of the specimens have been in my possession for several years, as I hoped to secure others of the same kind, whereby I might obtain their names without inconveniencing anyone by a request for their return. But they remain uniques with me to the present time ; solitary witnesses to the fact that they are to be got, if looked for in the right place at the right time.

The gentlemen to whose kindness I am indebted for the identification of my material are : Prof. J. B. Smith in the Bombycidæ and Noctuidæ, Rev. Dr. Hulst for the Geometridæ, and Prof. C. H. Fernald in the Micros. I have followed the sequence and nomenclature of Prof. Smith's list of 1891.

Scoleocampa liburna, Geyer.

I captured this specimen at Ridgeway in July, 1885. And I see by the Buffalo list of 1891 it is therein reported as "taken occasionally in Lancaster, at light," by Mr. E. P. VanDuzee. I am not aware of its having being taken in Canada since.

Epiglæa decliva, Grote.

A single specimen taken at Hamilton eight years ago, in the autumn, when looking for Scopelosomas and Lithophanes.

Xylina tepida, Grote.

A single specimen taken at London, September 29th, 1891. On one of my visits to Mr. Grote in Buffalo, whilst he was naming some Lithophanes for me, he called my attention especially to this species as "one that ought to be found with us," and yet this is the first intimation that I have received of its being taken in Canada.

Litognatha litophora, Grote.

Herminia petrealis, Grote.

Hypena damnosalis, Walker.

No doubt several more of the Deltoides might be added to our list, if they were closely looked after, but the unattractive appearance of many of them, and the difficulty in separating the forms, has a tendency to weaken the interest taken in them.

Acidalia subalbaria, Pack.

Eudeilinea herminiata, var. *albata*, Guen.

Semiothisa præatomata, Harv.

Tephrosia cognataria, Hub.

Paraphia unipunctaria, Haw.

Petrophora truncata, Hub.

Phlyctænia extricalis, Guen.

Homophysa psychicalis, Hulst. Two specimens taken at London in 1892. This handsome little species was described and named *Botis psychicalis* by Dr. Hulst in 1886, from two females taken in Georgia and Texas.

Hydrocampa stenialis, Guen.

This delicate and highly ornamented species I had taken at Hamilton for several years, one or two in a season, although only obtaining the name of it last November. During the season of 1892 I came on a colony of it at London and secured six. It is variable in size and depth of colouring, but varies little in the design of ornamentation, considering it is so elaborate. Dr. Hulst redescribed a specimen from Florida, under the name of *H. australis*. He gives the expanse of wings as 16 mm. I have one that is 15 mm., but I also have one that is only 10. Dr. Hulst gives the colours as fuscous and light ochreous. One of my specimens is of a deep leaden hue, with the light portions greatly reduced in size.

Schœnobius melinellus, Clem.

Perispasta caeculalis, Zell.

A single specimen taken at Hamilton several years ago. It was sitting on the upper side of a leaf quite exposed. Its unusual form and marking attracted my attention at the time, and although I looked for it regularly afterwards in that locality, at the same season of the year, I never came upon another, and the only other one I have seen was sent to me for determination by Mr. Winn, of Montreal.

Perispasta immixtalis, Grote.

A single specimen taken at London in the season of 1892, and that in rather poor condition.

Teras nivisellana, Wlsm.

" *variana*, Fernald.

Cacœcia rosana, Linn.

Œnectra pilleriana, Schiff.

Exartema punctana, Wlsm.

This attractive species I had been taking for a number of years at Hamilton, one and two specimens in a season. It was moderately plentiful in one locality at London during the early part of July, where I secured about a dozen and a-half specimens of it. It is quite variable in size and depth of shading. My specimens range from 15 to 25 mm. in expanse of wing, the smallest males being, as a rule, the lightest in colour.

Sericoris bipartitana, Clem.

Pædisca otiosana, Clem.

Semasia signatana, Clem.

Argyresthia andereggiella, F. V. R.

Laverna subbistrigella, Haw.

Butalis impositella, Zell.

THE SYSTEMATIC POSITION OF VARINA ORNATA, NEUM.*

BY A. S. PACKARD.

For a specimen of this most interesting moth I am indebted to Mrs. Slosson, and after an examination of it I am unable to find any Bombycine characters, except the heavily pectinated antennæ. In Prof. Smith's List of Lepidoptera it is placed in the Liparidæ between Artaxa and Lagoa, though it bears no resemblance to these moths except in the shape of the antennæ. It has also been regarded as allied to the Cochliopodidæ. Prof. Smith has recently stated that it is a synonym of *Acherdoa ferraria*, Walk. (See CAN. ENT., xxiv, 135, 1892). It appears from its heavily pectinated antennæ to belong among the Noctuo-Bombyces, and all its characters indicate its affinities with the Noctuina. On denuding the head, the front is seen to be very full and convex, and those who claim that the characters of the head are useless in distinguishing families, we would refer to this case, as no Bombycine moth with which we are

*Papilio iv., 94, 1884.

acquainted has such a full, protuberant front. The palpi are also truly noctuid in shape, the joints being very distinct, the 3rd joint long and slender compared with those of the Bombyces. The forewings have a well-developed dot and reniform spot, genuine Noctuid marks, and the hind wings have the peculiar gloss of Noctuid moths. The venation of the wing is unlike that of the Liparidæ and Cochliopodidæ, and entirely unlike that of the Notodontidæ. There are 4 branches of the median vein, and their arrangement and that of the subcostal veinlets appears to be characteristically Noctuid.

I am confirmed in the view that this moth belongs among the Noctuids by the following observations of Mrs. Slosson, who was fortunate enough to hatch out the larvæ, and to find that they are semiloopers, like the freshly-hatched larvæ of many Noctuids.

"I captured at light, in the spring of 1891, a *Varina ornata* ♀ and placed her at once in a box made for the purpose. But when I opened the box for examination I found to my chagrin, that I had unfortunately closed the lid upon my treasure and crushed her to death. As the abdomen seemed somewhat distended, I pressed it gently, and had the satisfaction of seeing two eggs drop out. I could secure no more. As it was late at night and my light was poor, I deferred close examination of the eggs. The next day I was attacked with neuralgia in the eyes, and was quite unable to use a magnifying glass. On the 6th or 7th day the eggs were hatched. I was still suffering, and could make no close observations. But one thing was plainly to be seen, the larvæ were "loopers"! This I could see for myself, and an unscientific friend who looked at them through a lens at once declared them to be "measuring worms." Knowing nothing of the food-plant, I sent out for leaves of the various trees and herbs growing near. But the larvæ would eat nothing. On the third day, though still alive they were very weak. I placed a bit of palmetto—*Sabal serrulata*—in their glass, and they at once crawled feebly upon it, and began nibbling its surface. But it was too late, and not knowing how vastly important to science would be a prolongation of their existence, they quietly passed away. I regretted deeply my lost opportunity of settling finally the proper position of this interesting moth. But I can but consider this proven fact of the young larvæ's being loopers a very significant one."

CATOCALINE MOTHS FROM GEORGIA.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In the collection of the Bremen Museum are a number of *Noctuidæ Catocalinæ*, brought by Norwich, many years ago, from the vicinity of Savannah, Georgia, and belonging to species for the most part new to me. Nearly all are now identified by me as described by Guenée in the Species General, and their notice here can hardly fail to be of interest. I have previously remarked upon the fact that, as we progress southwardly, we are met by an increase in the number of species of Catocaline Owlet Moths, while the *Noctuinæ*, or typical *Noctuidæ*, diminish; the metropolis of the former seems to lie in the Tropical, of the latter in the North Temperate Zone. But already in the Southern States we meet with many species of Banded Owlets, which seem absent in Canada and the Northern United States.

Grammodes, Guen.

Guenée describes in the Species General three North American species, *Smithii*, *Similis* and *Consobrina*, under the generic term *Ophiusa*, Tr., a name which, being pre-occupied in zoology, cannot be retained. These three species, then unknown to me in nature, I referred temporarily to the genus *Grammodes*, in the Buffalo Check List, 39, 1876, as also in the New York Check List, 39, 1882. This course is followed by the Philadelphia Check List, 57, 1891. At this writing I have not the necessary means or material to satisfactorily review the generic position of the species described in the present paper. Of Guenée's three American species of *Ophiusa*, two, *Smithii* and *Consobrina*, are now identified by me in the Norwich collection. These two are closely allied, so much so that, at the first glance, they seem the same, though readily distinguished. Under these circumstances it seems inexplicable to me that Guenée should place them in two distinct groups, and should interpolate a group and follow *Smithii* with a species, *similis*, which, from the description, must differ somewhat widely in appearance. The two species before me seem allied to *Euclidia cuspidea*, while in the dusty-gray colour, texture and vestiture, they resemble *Drasteria*. They are distinguished by the fine, even, cleanly-cut and very distinct median lines. All the species here included have a deep brown or blackish, apical, liturate mark. That they will remain under this generic title, which is only a substitute for *Ophiusa*, as used by Guenée for them, does not seem probable to me.

1. SMITHII, Guen., Sp. Gen., VII., 266, 1852, *Ophiusa.*

The forewings are powdery light ash-gray over brown, with a slight violaceous reflection. The brown colour appears as a diffuse deeper shading before the t. a. line, and again before the t. p. line over the outer portion of median space. T. a. line narrow, brown, slightly bent and relieved outwardly against the gray median space. T. p. line similar in appearance, but very cleanly cut and even, forming two angles outwardly ; the first and most prominent opposite the cell, the second projection on the interspace above vein 1 ; thus the line forms three subequal scallops, the upper one shallower and more oblique, the middle one the longest. A deep brown, inwardly oblique, shaded apical mark, terminating in a second linear one, which appears as if dislocated and turns outwardly. Hind wings obscure brown, a little dusted with grayish on the outer margin before the angle. Beneath both wings concolorous, paler yellowish-brown, with a faint darker median line and discal point. On primaries above the brown reniform is feebly marked. Body concolorous. Two female specimens examined, expanding 37-38 mil. In Mus. Brem.

Guenée names this species for one of the authors of the "Insects of Georgia."

2. CONSOBRINA, Guen., Sp. Gen., VII., 1852, *Ophiusa.*

Almost exactly like *Smithii.* The base of primaries somewhat darker shaded, hardly ashen; the liturate apical mark seems to run inwardly obliquely throughout its length and is uniformly preceded by a deep brown shade, appearing continuous. The t. p. line wants the second angulation and thus forms a single curve from a point opposite the cell to the inner margin. These seem the only differences in markings. Two males examined, expanding, one 40, the other only 35 mil. In Mus. Brem.

I regard it as not impossible that *Consobrina* is the male of *Smithii.* The antennæ in both are simple, the joints provided with short hairs beneath. The terminal joint of the palpi appears to be shorter in *Consobrina*, and probably really is so, but this feature might be sexual. Guenée does not note the sex of his material. In ornamentation the only differences I find are in the apical shade and the t. p. line ; this latter character alone is strongly marked and leads one to suspect a distinct species. The difference in size noted by Guenée (p. 268) does not exist. In this group of moths the male is not infrequently much larger than the

female, but is inconstant in size of wing. One specimen of *Consobrina* is in this respect smaller than *Smithii*. As to the difference in shading, it appears to me quite unimportant and not unlikely a variable character.

3. Similis, Guen. Sp. Gen. VII., 267, 1852. *Ophiusa.*

"40 mil. Wings entire, powdery, of an even violaceous ashen, shaded here and there with reddish; with the two median lines hardly visible, very fine and, between them, another similar line bent in an opposite direction to the t. p. line and nearly touching the latter at either extremity, the whole hardly distinct. A black apical mark, composed of two little triangles united at apices, a little shaded interiorly. Hind wings light brown, with the fringes ashen. Beneath of the same brown, with indistinct line and lunule.

Var. Apicalis, id. The arcuate median line largely shaded with blackish exteriorly."

This species is unknown to me. It cannot be the succeeding form owing to the given colour, the triangulate apical spots, and the arcuate median line.

4. Concolor, n. s.

♂ Entirely of a light chocolate brown. The forewings unicolorous, with a slight frosty violet reflection, without any perceptible markings or any darker shadings, except the liturate dark brown apical mark, which is oblique, of nearly uniform width and subcontinuous. Hind wings plain brown, the outer edge and fringes very slightly shaded with ashen. Beneath paler, concolorous yellowish-brown, with faint traces of one or more common lines and discal dots. Palpi slightly exceeding the front. Antennæ simple, the joints beneath with short hairs. One specimen, expanding 42 mil., in Mus. Brem.

♀ Somewhat darker than the male. The frosty violaceous shade obtains strongly over basal half of primaries and allows an uneven darker t. a. line to be faintly visible. At the centre of the wing, in the place of the median shade, is a straight sharp line of demarcation, beyond which the wing is outwardly diffusedly much darker shaded, the dark colour fading to the fringes and allowing the apical mark to be plainly visible. In one specimen the apical mark is apparently linear and dislocated in-

feriorly. Else as in the male. In one specimen there are terminal dots near the anal angle of secondaries. Two specimens, one expanding 46 mil., the other only 38 mil. Savannah, Norwich, in Mus. Brem.

Renewed examinations of the male of this prominent and well-sized species show, that in certain lights exceedingly faint traces of the t. a. line may be discerned. But the brown surface of the wing is unbroken to the eye, without lines or discal spot, and is relieved only by the distinct apical mark.

AGNOMONIA, Hübn.

1. ANILIS, Drury, II., 21, Pl. XII., 3, 1770–1775.

Sequistriaris, Hübn., Zutr., 419–20, 1825, *Agnomonia.*

Anilis, Guen., VII., 273, 1852, *Agnomonia.*

Two specimens of this not unusual species from Savannah in Mus. Brem. In this genus the apices of forewings are sharp, the short fringes usually discolorous, the external margin sinuous or straight, not rounded; the forewings have a certain lustre on their upper surface.

2. QUADRIFILARIS, Hübn., Zutr., 569–70, 1825, *Agnomonia.*

Guen., VII., 300, 1852, *Poaphila.*

Two specimens of this well-marked species from Savannah in Mus. Brem. Smaller than *anilis*, of a lighter lustrous brown. The forewings crossed by two white median stripes, narrower than in *anilis*, and continuous, whereas in *anilis* the outer band is abbreviated. *Anilis* is much stouter with the external margin sinuate, curving inwardly below the apex.

3. OBSOLETA, Grt. Proc. Bost. Soc., N. H., 417, 1876, *Poaphila.*

Quadrifilaris, var. A., Guen., VII., 301, 1852, *Poaphila.*

Of this species, taken by Dr. Thaxter in Florida, there are no specimens in the collection. According to my observation, it is decidedly distinct from *Quadrifilaris.*

4. ERASA, Guen., VII., 301, 1852, *Poaphila.*

The forewings are of a somewhat grayish or fuscous-brown with a slight lustre, darker shaded outwardly. The markings are quite indistinct,

and only traces of the transverse lines can be made out. The short fringes are tipped with whitish; apices pointed, external margin quite straight. Hind wings without markings; abdomen somewhat grayish. An inconspicuous species, distinguishable by the pale fringes. One male before me from Savannah, expanding 31 mil., in Mus. Brem.

Probably most of the species referred to *Poaphila* in the Species General, and in our Check Lists, belong really to *Agnomonia*. Of the species described by Guenée I have not identified anywhere *Contempta* or *Bistrigata*. *Poaphila sylvarum*, in the collection before me, may be considered typical of its genus. *Flavistriaria*, *perplexa*, and *herbarum*, determined by me in Coll. Mus. Brem., are apparently related to *Phurys* and *Celiptera*, as also is *Bistrigata* from Hübner's figure. I have described two species in Bulletin, U. S. Geol. Survey, IV., 184, 185, which may also belong to *Agnomonia*. The types are in Coll. Brit. Mus. A name to be admitted must be sanctioned by figure or description. But what are we to do with the bad descriptions of the British Museum Lists? Can the supposed types of Mr. Walker be admitted as evidence? In cases where they in any way contradict the description I think certainly not.

PHURYS, Guen.

1. FLAVISTRIARIA, Hübn., Zutr. 555–6, 1825, *Crochiphora*.

Guen., VII., 302, 1852, *Poaphila*.

The forewings are grayish-brown, with a faint discal mark and a rigid ochre-yellow subterminal band, followed by a narrower dark brown shade line. Two specimens before me, which belong evidently to the species described by Guenée, but do not quite agree in shape of wing and appearance with Hübner's figure, while the only markings correspond, and these are so simple that it must be the species. The identification of *flavistriaria* has led me to that of Guenée's *perplexa*, described comparatively in the Species General. Guenée changes the specific name to *Flavistriaris*.

2. PERPLEXA, Guen., VII., 303, 1852, *Poaphila*.

Glaus, Grt., Proc. Bost. S., N. H., 416, 1876, *Phurys*.

This species differs from *Flavistriaria* mainly by the concolorous pale gray colour, while the subterminal stripe has less yellow, the dark brown

line predominating. Faint indications of an uneven t. a. line. The discal mark almost obsolete. Faint terminal dots may be discerned. Hind wings gray without lines. Two specimens, Savannah, Georgia, in Mus. Brem.

The more of our species of Catocaline Noctuids, belonging to the group of which *Drasteria* may be considered typical, the so-called "Grass Moths," I have become acquainted with, the more do I see the necessity for their generic revision. But the material I have had at any one time has been so small and fragmentary that I have been unable to attempt it.

DESCRIPTIONS OF CERTAIN LEPIDOPTEROUS LARVÆ.

BY HARRISON G. DYAR.

Colias Behrii, Edw.

Egg.—Spindle shaped, a little contracted just before the tip, with low longitudinal and transverse ridges, which divide the surface into shallow, rectangular parallelograms. Length, 1.3 mm.; width, .6 mm. The eggs are laid singly on the upper side of the leaves of a species of ground huckleberry, its food plant.

First stage.—Head rounded, dark brown; width, .25 mm. Body of normal shape, sordid whitish, apparently without marks; minutely pilose.

Fifth stage.—Head rounded, very slightly bilobed, slightly reticulated with brown; no other marks; width, 2 mm. Mouth parts brown; ocelli and jaws black. An even, pinkish white dorsal line, very narrowly black bordered, runs the length of the body, tapering a little at each end, obsolete on joints 2, 3 and 13. A broader, even, subdorsal line, nearly white on the edges, salmon-coloured centrally, and bordered above by a black lunate shade on the anterior part of each segment. A similar, very even substigmatal band, pinkish centrally; the bordering black shades surround the spiracles and are larger and more diffuse than those above the subdorsal band, but very faint on the thoracic segments. A faint, even, lateral band, paler than the ground colour, which is probably some shade of green in living specimens. Spiracles white, the pair on joint 12 larger than the others. Thoracic feet testaceous.

Pupa.—This seems not distinguishable from that of other species of Colias. Thorax large, the back arched and cases prominent; abdomen

tapering ; cremaster short, square at tip, flattened and firmly adhering to the silken web. It appears to have been yellowish-green, a lateral pale line on the abdomen, the antenna cases marked with pink.

Described from alcoholic specimens collected by Mr. J. B. Lembert in the High Sierras of California. Concerning the habits of this insect, Mr. Lembert writes :—"July 27th, about nine or ten in the morning of the third day of search, I discovered the food-plant of the hardy little mountaineer. His little queen fluttered into the grass on the meadows at the base of Mt. Gibbs. When she had laid about five or six eggs, she flew on to the dry moraine and sandy hills to eat flowers, and in the meantime another took her place. The eggs were deposited on the low growing huckleberry vine, which is lower than the grasses that it grows among, affording protection to the eggs and larvæ against the dews and frosts that prevail at any day on the highland meadows. The males outnumber the emales six to one, according to my catch, as the latter feed on the flowers growing on the old moraines which rise up out of the meadows, and only fly to the meadows to deposit their eggs.

When the larvæ get large they hide, and in the first stage they are almost invisible. When ¼ inch long they are semi-transparent ; when ⅓ inch, they get about the colour of a lightly bruised apple and worm-like, without spines. They greatly resemble the withered huckleberry ruit. The eggs when first laid are glistening white, then dull white, and finally greenish. They hatch in six days."

Ichthyura vau, Fitch.

Egg.—Hemispherical, flat below, the shell semi-transparent white. Under the microscope it appears covered with small, slight depressions, closely crowded together and forming obscure roundedly hexagonal reticulations; diameter, .9 mm. Laid singly, or as many as seven together on the under side of a leaf. The larva hatches by eating a piece off of the vertex of the egg, which may remain attached to the shell like a circular trap door.

Third stage.—Head slightly bilobed, rounded, clypeus depressed, hairy, especially on the lower part ; shining black throughout. Cervical shield and anal plate blackish. Body vinous-brown, with a broad band of sordid yellowish-white, absent on joints 5 and 12, and containing a

triple brown line. Subventral space, from the spiracles to the feet, irregularly mottled and streaked with yellowish. Feet black. The minute piliferous tubercles of rows 1 and 2 are stained yellow. Width of head, 1.2 mm.

Fourth stage.—Head round, full, pilose, blackish-brown, paler above the mouth and slightly shiny; width, 1.8 mm. Body largely obscure, purple-brown, this colour forming a triple dorsal line and covering the whole lateral area to the feet. Dorsum grayish-white between the lines, and this colour also obtains in a rather broad lateral line and minute mottlings all over the brown area, which are distinct without a lens only subventrally. Thoracic feet black, abdominal ones concolorous with the body. The tubercles are very inconspicuous, but row 1 is marked by little yellow dots through the whole length. The hairs are fine and short, pale, those arising from the body very much shorter than those from the tubercles. In another example joints 5 and 12 were seen to be slightly enlarged dorsally and coloured purple-brown, while all the turbercles of rows 1–5 were obscurely yellow.

Fifth stage.—Head slightly flat in front, blackish-brown, pale-purplish in the sutures; labrum sordid white; width, 2.3–2.5 mm. Body purplish-brown, marked as before, but the pale gray parts are slightly obscured by minute brown mottlings and the yellow piliferous tubercles are small but very distinct. Each bears its one hair and the rest of the body is minutely pilose. There are traces of a black bisected cervical shield; no distinct anal plate. In another example, the whole surface of the body was marbled with pale gray, greatly obscuring the lines, though the yellow tubercles were still distinct.

At maturity the body was sordid white, thickly mottled with pale brown, forming a faint triple dorsal, single subdorsal and stigmatal lines; spiracles black; tubercles orange.

Food-plant.—Species of willow (Salix). The larvæ live singly, each tightly wedged in a little house formed of leaves and silk, from which they come forth to feed. Larvæ from Boston, Mass.

NEBRASKA MYRIAPODA.

BY F. C. KENYAN, UNIVERSITY OF NEBRASKA.

Heretofore nothing concerning the Myriapoda of Nebraska has been published. Hence the following short list of species will not be without interest :—

Lysiopetalum lactarium, (Say).

Parajulus canadensis, (Newp).

P. impressus, (Say).

Spirobolus marginatus, (Say) Newp.

Leptodesmus floridus, Wood.

Fontaria virginiensis, (Drury) J. E. Gray.

Paradesmus erythropygus, (Brandt) Wood.

Polydesmus canadensis, Newp.

P. granulatus, Say.

Scolioplanes bothriopus, (Wood) Mein.

Geophilus cephalicus, (Wood) Mein.

Geophilus bipuncticeps, Wood.

Scolopocryptops sexspinosus, (Say) Newp.

Scolopendra woodii, Mein.

Archilithabius malterris, sp. n.—Prosternal teeth, 2 + 2. Ocelli, 10–12, arranged in 3 rows. Antennal articles, 21. Coxal pores, 2, 3, 3, 2–3, 3, 4, 3, or 10–13, round. Spines on the first pair of legs, 2, 3, 1 ; on the penultimate pair, 1, 3, 3, 1 ; on the anal pair, 1, 3, 2, 0. Claw of female genitalia entire. Slender, light chestnut, head darker. Joints of antennæ rather long. Length, 12–13 mm.

From the Bad-lands, Sioux Co.

Archilithobius nebrascensis, sp. nv.

Prosternal teeth, 2 + 2. Ocelli, 11–15, arranged in 3 rows. Antenna; articles, 20–21. Coxal pores, 2, 3, 3, 2–3, 4, 4, 3, or 10–14. Spines on the first pair of legs, 1, 1, 1–1, 2, 1 ; on the penultimate pair, 1, 3, 3, 2 ; on the anal pair, 1, 3, 2, 0. Claw of female genitalia bipartite. Rather robust. Orange-brown ; head darker, smooth ; shortly pilose. Head subrotundate. First scutum, large, subquadrate. Antennæ, long, tapering, shortly pilose ; articles long. Length, 11 mm.

A. dorsopinorum, sp. nv.

Prosternal teeth, 2 + 2.. Ocelli, 11–15, arranged in 3 rows. Articles of the antennæ, 21. Coxal pores, 3, 4, 4, 3–4, 5, 5, 4, or 14–18. Spines on the first pair of legs, 1, 2, 1–2, 3, 1 ; on the penultimate pair, 1, 3, 2, 1–1, 3, 3, 2, on the anal pair, 1, 3, 2, 1. Penultimate pair of legs armed with 2 claws ; the anal legs with one claw. Claw of female genitalia tripartite.

Body depressed. Light brown ; head a little darker. Anal legs only slightly crassate.

This seems to be related to Bollman's *elatus*, but is distinguished from that species by having the ocelli and the coxal pores more numerous, and the spines of the anal legs differently arranged.

A. Bruneri, sp. nv.

Prosternal teeth, 2 + 2. Ocelli, 9-12, arranged in 3 rows. Antennal articles (♂)20–(♀)21. Coxal pores, round, 2, 3, 3, 2–3, 4, 4, 3, or 10–14. Spines on the first pair of legs, 0, 1, 1–2, 2, 1 ; on the penultimate pair, 1, 3, 3, 2 ; on the anal pair, 1, 3, 3, 1. Penultimate legs armed with 2 claws ; the anal pair with one. Claw of female genitalia entire.

Scarcely robust. Light chestnut ; head and first scutum darker ; pilose. Head subrotundate ; longer than broad. Antennal joint, head-like, thickly pilose. Body tapering anteriorly. Anal legs not crassate, pilose ; fifth joint sulcate beneath ; the last two joints decidedly flattened on the inner side.

Lithobius sexdentatus, sp. nv.

Prosternal teeth, 3 + 3. Ocelli, 19–24, arranged in 4 rows. Antennal articles, 20–21. Coxal pores, 4, 4, 5, 4–4, 5, 5, 4, or 17–18 ; round. Spines on the first pair of legs, 1, 3, 1–2, 3, 1 ; on the penultimate pair, 1, 3, 3, 2 ; on the anal pair, 1, 3, 2, 0. Anal and penultimate legs each armed with a single claw. Claw of female genitalia entire. Slightly robust, dark chestnut ; head darker. Head subrotundate ; longer than broad. Antennæ short, pilose, articles long. Anal legs slightly crassate Length, 12 mm.

From the Bad-lands of Sioux Co.

L. Celer, Boll.

L. forficatus (Linn) Leach.

Neolithobius mordax, (Koch) Stux.

Scutigera forceps, (Raf.) Latr.

CORRESPONDENCE.

PARNASSIUS CLODIUS AND P. SMINTHEUS.

SIR,—Good specimens of these species are generally easily separated, but occasionally specimens are taken the identity of which it is difficult to decide. Mr. C. de Blois-Green, of Victoria, B. C., who has taken both specimens in large numbers, has drawn my attention to a character which he finds reliable in all instances. This is that in *Clodius* the antennæ are uniformly black, whilst in *Smintheus* they are ringed with white. Of course, when the abdominal pouch is attached, there is no difficulty in separating the female of *Clodius* with its large pouch from *Smintheus* with its small keel-shaped appendage. The value of these abdominal pouches has been well-worked out by Mr. H. J. Elwes in an exhaustive paper published in the Transactions of the Entomological Society of London. Some specimens received from Mr. de Blois-Green were sent to Dr. H. Strecker, and his opinion asked as to the value of the character based on the colour of the antennæ. His reply, which I think will be read with interest by lepidopterists, is as follows:—

"Your letter and the remnants of the *Parnassius* received. The latter are only *Clodius*, of the form found in the State of Washington and western British Columbia; those further south (California) are not as large nor as brightly coloured, as a general thing. Your correspondent is right in laying stress on the black antennæ. *Clodius* belongs to a group and is allied to some sub-group having black antennæ and large pouches. They embrace *Nordmanni*, from Armenia; *Clarius*, from W. Siberia; *Eversmanni*, from Alaska and Siberia; *Felderi*, the Amoor; *Mnemosyne*, Germany and Switzerland, etc.; *Stubendorfii*, Siberia; and *Glacialis*, Japan; whereas *Smintheus* has white-ringed antennæ, and its allies, distinguished further by the keel-shaped pouch, are *Apollo*, Germany; *Hesebolus*, Mongolia, etc.; *Nomion*, Siberia; *Jacquemonti*, Himalayahs, etc., with white-ringed antennæ also; but there are sub-groups allied to these with the same keel-like pouch as *Apollinus*, Tartary; *Honrathi*, Turkestan, etc., that have all black antennæ, so there is no rule without an exception. Our *Parnassius*, according to my views, are but three species:—

1. *Smintheus*, Dbldy—Hew.
2. *Clodius*, Men.
3. *Eversmanni*, Men.

All the others, such as *Thor*, *Menetriesii*, etc., are but varieties or aberrants. It would be easy to make fifty such species of *Smintheus* alone, if you took them at various altitudes and locations. Some butterflies, as, for instance, *Papilio Turnus*, of which I have great giants from North Carolina, Georgia, etc., expanding 5½ inches, while others from the White Mountains spread only 2½ inches, and there are all sorts of shades of yellow, orange, brown and black, and yet who would think of making a dozen species of these? I notice that Mr. W. H. Edwards includes *Par. Nomion* in our fauna. I think somehow he must be mistaken, unless possibly it was caught in Alaska."

HERMAN STRECKER."

Feeling sure that the above letter will be of interest to many of our readers, I have obtained Dr. Strecker's permission to publish it.

JAMES FLETCHER, Ottawa.

UNIDENTIFIED BOMBYCIDS.

SIR,—Messrs. Dyar and Neumoegen have struck a snag in their work, according to their statement in CAN. ENT. for May, 1893. I am glad that I am able to help them over one part of it. Of the "unidentified names," *Saligena personata* has been long since referred as a synonym of *Raphia frater*, and I am able to confirm the correctness of the reference. So *Edema obliqua* has been proved a noctuid, and an *Arzama*. As *Sphdia* or *Arzama obliquata*, it is a well-known insect. Messrs Neumoegen and Dyar are following Mr. Kirby's use of generic terms very closely. It would be a matter of some interest if they would inform us whether, in the case of Hübner's Tentamen, they have independently concluded that it should be adopted, or whether they simply follow Mr. Kirby without original investigation. So few of the working entomologists have accepted the Tentamen as authority, that it is not impertinent to ask why they have joined the minority. JOHN B. SMITH.

PROF. C. H. TYLER TOWNSEND

has been appointed Curator of the Museum at the Institute of Jamaica, in place of Mr. T. D. A. Cockerell, who has recently resigned on account of ill-health. Mr. Townsend's address is now Kingston, Jamaica, West Indies. We wish him much success and prosperity in his new position, and trust that he will continue to favour us with his valuable communications.

Mailed June 12th.

The Canadian Entomologist.

VOL. XXV. LONDON, JULY, 1893. No. 7.

COMMENTS ON MR. VAN DER WULP'S RECENT DIAGNOSES OF NEW SPECIES OF MEXICAN PHASIIDÆ, GYMNOSOMATIDÆ, OCYPTERIDÆ, AND PHANIIDÆ.

BY C. H. TYLER TOWNSEND.

Mr. F. M. van der Wulp, the well-known Dutch dipterologist, has recently published, in the *Tijdschrift voor Entomologie*, vol. 35, pp. 183–195, short diagnoses of a large number of new species and several new genera of Mexican Tachinidæ sens. lat. Of these, there are 33 new species and 4 new genera which belong to the above four groups. Of such well-known and well-worked genera as *Trichopoda*, there are 4 new species; of *Hyalomyia*, 10 new species; of *Cistogaster*, 8 new species!

This material was received by Mr. van der Wulp from the editors of the Biologia Centrali-Americana, but too late to be included in his parts on the above groups, which had already been published. These forms are to be fully described at some future time in a supplement to the Biologia. No localities whatever accompany the short diagnoses.

I desire to offer the following notes on these species:—

PHASIIDÆ.

Trichopoda nitidiventris, ♂, is described as having the cilia of hind tibiæ black with yellow tips. This must be a quite divergent form, since it is the first one known with the tibial cilia varicoloured. It is also very distinct from the previously known forms in having the abdomen shining black with a rufous anus.

T. alipes, ♂, seems to be different from the described species, inasmuch as the tip of the wing, as well as the hind border, is broadly hyaline.

T. squamipes, ♂, seems quite distinct in its yellowish rufous scutellum and abdomen. *T. histrio*, Wlk. (*trifasciata*, Liv.), is the only species known to me with a yellowish, or other than a nearly black, scutellum.

N. Y. ACADEMY LIBRARY

T. nigripes, ♂ ♀, must be near *T. pennipes*. It is smaller, however, and the face and front are whitish instead of golden-yellow.

HOMOGENIA, nov. genus, v. d. W.

This genus must be closely allied to either *Xysta*, or *Phasia*. It is described as similar to *Trichopoda*, but with apical cell open, and cilia of hind tibiæ short and less conspicuous. This name is preoccupied (Homogenes) by Thomson in Coleoptera. I propose, therefore, that the genus be known as *Trichopododes*, from its close relationship with *Trichopoda*, as shown by its somewhat less ciliate hind tibiæ. Three species of it are described, from 7 to 11 mm. long. They are: *Trichopododes rufipes*, ♂ ; *T. latipennis*, ♂ ♀ ; and *T. nigroscutellata*, ♂.

Hyalomyia munda, ♂, seems distinct in the whole body being thickly covered with a yellowish-gray tomentum.

H. villosa, ♂, also seems distinct in its dense yellowish pilosity.

H. hebes, ♂, is apparently distinct in the shorter yellow pilosity.

H. ochriceps, ♂, seems very close to *H. æneiventris*, Will.

H. argenticeps, ♂, is also apparently very near *H. æneiventris*, Will. I do not see why the front in the above five male specimens is described to be as broad as, or broader than, the eyes, unless the anterior triangular portion of the front is meant. But this interpretation is precluded by the next five specimens being indicated as females, all of which are described as having the front trigonal and the eyes but little separated on the vertex. I do not know of any *Hyalomyias* which have the front as broad as the eyes,

H. nigrens, ♀, does not apparently differ much from *H. punctigera*. Twns., so far as can be gathered from the short description.

H. piceipes, ♀, may be a valid species.

H. mœrens, ♀, is quite near *H. purpurascens*, Twns. The wings, however, of the latter are not brown, but whitish.

H. umbrosa, ♀, is a similar but larger species.

H. umbrifera, ♀, is allied to *H. punctigera*, Twns.

GYMNOSOMATIDÆ.

Cistogaster ruficornis, ♂, seems to be *Gymnosoma filiola*, Liv., ♂.
C. melanosoma, ♀, is probably *C. pallasii*, Twns.
C. subpetiolata, ♀, seems only a variety of *C. pallasii*, Twns.
C. propinqua, ♀, seems very near *C. immaculata*, Mcq., ♀.
C. griseonigra, ♀, may be same as *C. occidua*, Walk., ♀.
C. ferruginosa, ♂, is probably *C. immaculata*, Mcq., ♂.
C. hirticollis, ♂, is doubtless *C. occidua*, Wlk., ♂.
C. variegata, ♂, seems to be only a variety of preceding.

OCYPTERIDÆ.

Ocyptera signatipennis, ♂, is probably *Ocyptera euchenor*, Wlk.

XANTHOMELANA, nov. genus, v. d. W.

This genus must be very similar to *Ocyptera*, differing only by the curved, not angulated, fourth vein, and the shortly petiolate apical cell, with the petiole ending at the wing's tip. This name is also preoccupied (Xanthomelon, Mart., Moll., 1860), and may be changed to XANTHOMELANODES. Six species are described, from 4½ to 7½ mm. long. They are:—*Xanthomelanodes articulata*, ♂ : *X. rubicunda*, ♂ (?); *X. dorsalis*, ♂ ♀ ; *X. trigonalis*, ♂ ; *X. gracilenta*, ♂ ♀ ; and *X. anceps*, ♂.

PHANIIDÆ.

CLINOGASTER, nov genus, v. d. W.

This genus must bear a striking resemblance to *Hemyda*, differing almost wholly in the short petiolate, instead of open, apical cell, and in the fourth vein being bent at an angle. It belongs apparently in the *Ocypteridæ*, however, and not in the *Phaniidæ*, as indicated by the elongate and incurvate abdomen.

Clinogaster notabilis, ♀, type of the genus, must be very similar in size and appearance to *Hemyda aurata*.

PENTHOSIA, nov. genus, v. d. W.

This genus is erected by Mr. van der Wulp for *Scopolia satanica*, Bigot (Ann. Soc. Ent. Fr., 1888, p. 254). Mr. van der Wulp has been kind enough to send me a specimen of this species, labelled : "Omilteme, Guerrero, 8,000 ft. July. H. H. Smith." It is a well-marked genus, bearing much structural resemblance to *Ocyptera*, but differing at once in its well-formed palpi, and its intensely and evenly black colour. It should, I think, also be included in the *Ocypteridæ*. Both this genus and *Clinogaster* exhibit a closer relationship with *Ocyptera* than do any of the other American genera of *Ocypteridæ*, by virtue of their petiolate apical cell.

To sum up :

The above 4 new genera appear to be quite distinct and valid. The species of *Trichopoda* appear to be distinct from those previously described. The *Hyalomyias*, at least the most of them, are doubtless valid species. This is not to be wondered at, since the genus *Hyalomyia* is rich in forms. It is more remarkable, however, that 4 new species of *Trichopoda* should turn up at this late day, and in a single collection.

When we come to the genus *Cistogaster*, and find 8 new species, we may well be astonished. This genus has never before been turned up in Mexico, or anywhere in tropical America. Though most numerous in individuals in most parts of the United States, there were heretofore but 3 species to be distinguished, and these might easily all be considered but forms of a single variable species Bearing this in mind, we are wholly unprepared for such a sudden increase in the number of species, and may well doubt their validity. With the single exception of the first species (*C. ruficornis*), they are probably all referable to the three already known species. From the description of *C. ruficornis*, I cannot resist the conclusion that Mr. van der Wulp has mistaken *Gymnosoma filiola*, Liv., for a *Cistogaster*.

Of course it is difficult, and to a certain extent uncertain, to judge of these forms from the brief diagnoses alone that have so far appeared. For this reason I feel called upon to delay the publication of Part I. of the Monograph of North American Tachinidæ, referred to in *Psyche*, Jan., 1893, until the Biologia supplement appears giving fuller descriptions of these species with drawings.

If any of the above comments prove to be erroneous in their conclusions, I shall be most happy to amend them.

DESCRIPTION OF THE GRUBS OF CHRYSOMELA EXCLAMATIONIS.

BY C. H. TYLER TOWNSEND.

This species is quite common in New Mexico, where it feeds on the native sunflower (*Helianthus sp.*). On August 7, 1892, at Belen, N. Mex., I found the native *Helianthus annuus* badly infested with the adults and numerous light green grubs of this species, which were eating the leaves extensively. From these grubs the following description is drawn :—

Larva (about full grown).—Length, 5½ to 7 mm. ; greatest width, 4 to 4½ mm. ; greatest thickness, 3 to 3½ mm. ; width of prothoracic segment, 2 to 2½ mm. ; of head, 1½ mm. Colour wholly light green, except head and legs, which are slightly tinged with brownish ; eyes, antennæ and jaws, brown. Shape subpyriform, curvate, very strongly convex dorsally ; slightly concave ventrally in lateral profile, but a little convex in longitudinal profile ;

tapering anteriorly to head, stout posteriorly, coming suddenly to a point at anal extremity. Transversely wrinkled, both above and below. Consisting of thirteen segments, head chitinous, other segments fleshy, the prothoracic segment hardly less so. Nearly naked, clothed only with a few very sparsely distributed hairs, somewhat more numerous on the prothoracic segment and head. Head semi-circular in outline from above, not retracted, narrower than prothoracic segment; second, third, fourth, and fifth segments each successively wider than its predecessor, and increasing at about the same rate; segments 6 to 8 about same width, a little wider than 5; 9 to 12 narrowing successively, each with greater rapidity than its predecessor; 13 very small. Prothoracic segment a little longer than head; segment 3 (in wrinkled condition of alcoholic specimens) about two-thirds length of second, the following segments increasing very slightly to the somewhat greater length of 6 to 9; 10 and 11 successively a little shorter; 12 and 13 very short, of about equal length, 13 bearing a blunt subbifid anal proleg. All the segments with a few short hairs on lateral edges, varying in number usually from 3 to 5, second segment and head with more. Eyes represented by six prominent brown or blackish, often glistening, simple eyes on each side of the head, four of them arranged in a transverse diamond just posterior to antenna and a little removed inwardly from edge of head; the other two situated on edge of head, more separated, one ventrad of the antenna and the other ventrad of the upper four. Antennæ small, situated in an excavation and somewhat sunken, 3-jointed; first joint stout, cylindrical, hardly as long as broad; second joint less than one-half the diameter of first, not as long: third joint nearly as wide as second, hardly as long. Labrum twice as wide as long, front border hollowed out, bearing two bristles on its dorsal surface, clypeus appearing as a long transverse narrow strip posterior to labrum. Mandibles stout, 5-toothed on the blunt apical portion. Maxillæ well-developed. Maxillary palpi 4-jointed, first joint short; second a little shorter than first, but nearly same diameter; third longer than first, narrower than second, cylindrical; fourth conical, almost as long as third, not as wide at base as third, and tapering evenly to a point. Labial palpi 2-jointed; basal joint stout, tubercular, hardly as long as wide, subcylindrical; the second joint conical, hardly as wide at base, and hardly longer than basal joint. A spiracle (the mesothoracic) on lower anterior portion of third segment; 5 to 12 with a spiracle on lateral portion dorsad of the lateral

ridge which separates the tergum from the venter on these segments; the thoracic segments extend farther ventrad on the sides. Legs apparently 4-jointed, corneous, first two joints more or less amalgamated, fourth shorter than third, terminated by a hooked claw.

Described from many alcoholic specimens. Belen, N. Mex. August 7.

A LIST OF SPECIES OF DIPTERA FROM SAN DOMINGO.

BY S. W. WILLISTON, LAWRENCE, KANSAS.

Some years ago I received a small collection of diptera from San Domingo, made by Mr. F. Frazar, a list of the species of which it is composed I herewith give. Hitherto scarcely two score species have been recorded from the island. The habitats followed by an exclamation point are given from specimens which I have examined:—

1. *Odontomyia*, sp.
2. *Cyphomyia*, sp.
3. *Lepidoselaga crassipes*, Fabr. South America! Mexico! Cuba.
4. *Chrysops costatus*, Fabr. South America! Cuba.
5. *Chrysops Frazari*, Will.
6. *Tabanus parvulus*, Will.
7. *Tabanus fenestra*, Will.
8. *Plesiomma lineata*, Fabr. St. Thomas.
9. *Laphria ruficauda*, Williston. Cuba!
10. *Andrenosoma chalybea*, Will. Cuba!
11. *Atonia Mikii*, Will.
12. *Proctacanthus rufiventris*, Maco. Honduras. Porto Rico.
13. *Erax*, sp.
14. *Ommatius vitreus*, Bigot.
15. *Psilopus chrysoprasius*, Walker. Cuba! Brazil! Porto Rico.
16. *Plagioneurus univitattus*, Loew. South America! Cuba.
17. *Microdon pulcher*, Will.
18. *Mesogramma aurulentum*, Will.
19. *Syrphus simplex*, Loew. Cuba.
20. *Ocyptamus dimidiata*, Fabr. Brazil! Mexico!
21. *Ocyptamus latiusculus*, Loew. Cuba.
22. *Ocyptamus fasciatus*, Roeder. Porto Rico.
23. *Eristalis atrimanus*, Loew. Cuba.
24. *Eristalis albifrons*, Wied. Brazil! Mexico! United States! Port Rico.
25. *Eristalis hortorum*, Fabr.

26. *Volucella obesa*, Fabr. Cosmopolitan.
27. *Pteroptila cincta*, Drury. Jamaica.
28. *Phrissopoda praeceps*, Fabr. South America.
29. *Lucilia*, sp.
30. *Compsomyia macellaria*, Fabr. Brazil! Mexico! United States!
31. *Dexia*, sp.
32. *Morinia*, sp. nov.
33. *Limophora*, sp.
34. *Belvosia Van der Wulpi*, Will.
35. *Blepharipeza leucophrys*, Wied. Brazil! United States! Porto Rico.
36. *Jurinia*. Two species.
37. *Jurinia apicifera*, Walker. United States!
38. *Trichopoda pennipes*, Fabr. Brazil! United States!
39. *Trichopoda*, sp.
40. *Sipedon macropus*, Walker. Cuba. Jamaica. Porto Rico.
41. *Calobata lasciva*, Fabr. South America! Cuba! United States! Porto Rico.
42. *Notiphila*, n. sp.

Fem. Flavo cinerea, facie flava, antennarum articuli tertii basi rufa, thoracis dorso vittis quinque humerisque brunneis; abdomen brunneum vitta media maculisque cinereis; pedes nigri, tibiis tarsisque posterioribus et tibiarum anticarum basi apiceque luteis.

FITCH'S TYPES OF N. A. MEMBRACIDÆ.

F. W. GODING, M. D., PH. D., RUTLAND, ILLINOIS.

During a recent visit to the city of Washington, through the kindness of Prof. C. V. Riley and his courteous assistants, I had the pleasure of examining typical examples of some of the Membracidæ described by Dr. Asa Fitch, the labels being in Dr. Fitch's own handwriting. Each specimen is numbered to agree with those given in the doctor's manuscript note-books, now in the possession of Dr. Riley and the Boston Society of Natural History. No. 11793 and 59782 are labelled *Telamona acclivata*, Fh.; on the label he states: "like cristata, Fm., but hind lobe rounded, not angular." This is *Heliria cristata*, Fm., ♀. No. 3109 is the typical example of *Telamona querci*, Fh. It is usually seen in collections labelled *monticola*, Fab, on whose authority I do not know. It is much smaller than that species and entirely different. I believe it to be a good species. It is a male. No. 2132, labelled *Atyta irrorata*, Mels., is *Telamona*

irrorata, Godg., described first in Bul. Ill. Lab. Nat. Hist., Vol. 3. It is the only description ever published. No. 2133, labelled *Telamona concava*, Fh., ♀, and apparently identical with No. 12727, a male. There is a beautifully coloured ♀ of this species in the collection of the Department of Agriculture, light and dark blue-green.

No. 3907 is *Telamona tristis*, Fh., ♀, and another smaller example doubtless the same. With these is a *coryli*, Fh., ♂, which I believe to be the same species as suggested by Van Duzee.

No. 2152, labelled *Ledra perdita* and *capra*, Mels., is *Centruchus Liebeckii*, Godg.

No. 6276, is *Microcentrus caryæ*, Fh., ♂, and No. 1878 is ♀. This species was erroneously referred, by Fitch, to the genus *Uroxiphus*. The female is about one-fourth larger then the male.

No. 6926 is labelled *Cyrtosia fenestrata*, Fh., ♀. It is the only example I have seen that agrees with Fitch's description "tip of the thorax reaching beyond the terminal cells of the elytra." In all the examples in my own collection the tip of prothorax barely reaches the terminal cells, while Mr. E. P. Van Duzee, a careful student and successful collector, informs me that all the specimens he has seen agree with my own.

No. 11764 is labelled *Cyrtosia fuliginosa*, ♀, described and figured in Emmon's valueless work on the Insects of New York. The dorsum is dark-brown with an arcuated yellow stripe on each side; legs yellow.

No. 3038 is labelled *Cyrtosia discoidalis*, ♀; also No. 4837. Described in Emmon's work. No. 11763 is *Cyrtosia pallidifrontis* of the same author and doubtless the same.

No. 11777 = *Cyrtosia maculifrontis*, and No. 4536 = *Cyrtosia cinereum* of the author's.

There are many other examples of this genus [*Cyrtosia* being preoccupied, I have given to this genus the name *Cyrtolobus*] in the collection under various manuscript names, such as *nigra*, *punctifrontis*, *tricincta*, etc., which may be distinct species, but I am inclined to the opinion that they are variations of a single species and that species may be *Vau* of Say.

There are several examples of the genus *Ophiderma* in the collection, under the manuscript names *nigripennis*, *arquata*, *rectinevra*, *flaviguttula*, *bicincta*, *nigriventris*, *dimidiata*, *columbis*, etc., which I believe are variations of not more than two species.

In the collection are to be found examples of *Platycotis 4-vittata*, Say, = *4-lineata*, Germ. It is a dimorphic species, as has been proven by Prof. Riley and Mr. Ashmead, the anterior horn being present in the one and wanting in the other. Both forms are represented in the Fitch collection and in my own cabinet.

NORTH AMERICAN THYSANURA.—II.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The genus *Japyx* has been of particular interest because of the apparent absence of rudimentary abdominal appendages. One American * writer says very decidedly, "*Japyx* has none"; a well-known English † writer considers these appendages as "represented by mere groups of stiff hairs." The presence of these appendages was indicated as early as 1869, by Brauer, ‡ in his description of *Japyx gigas*. In 1889 there appeared a very important paper by Haase §, in which the rudimentary appendages are distinctly shown. These appendages can easily be seen in either of the species described below.

JAPYX SUBTERRANEUS, Pack.

1874, *Japyx*, Packard, Amer. Nat., VIII., 501.

Head quadrangular, not broader than long. Antennæ about thirty joints. Prothorax narrower than the head, truncate in front. Abdomen gradually broader behind, segments marked on each side with whitish dots, arranged in the form of a figure six; segments one to six rounded at the sides, the seventh slightly emarginate behind, posterior angles produced, not spinate, eighth subequal to the seventh, longer than the sixth, slightly emarginate behind, sides straight; ninth segment one-third the length of the eighth, posterior angles not produced; the tenth segment and forceps subequal in length, together equal in length to the four preceding segments. Right arm of the forceps broader than the left, with a stout tooth on the inner margin near the middle; in front of this tooth the inner margin is convex with four small tubercles, adjacent to the tooth, beyond the tooth the arm is concave and armed with tubercles to the apex. The left arm is broadest at base, becoming gradually narrower till a little beyond the middle, where there is a large tooth-like tubercle, in front of this tubercle the arm is concave and armed with seven to eight small tubercles; beyond the tubercle the arm is convex and armed with very small tubercles.

---

* Packard, Standard Natural History., II, 1884, 137.

† Lubbock., Monog. Collem. and Thys., 1873, 205.

‡ Brauer, Verh. Zool.-bot. Ges. Wien, XIX., 1869, 557.

§ Haase, Die Abdominalanhange der Insekten mit Berucksichtigung der Myriopoden, Morphol. Jahr., XV., 1889, 330-435; pls. XIV.-XV.

Length, 12–14 mm. ; length of the antennæ, 4 mm. ; length of the abdomen, 8 mm. ; length of the last abdominal segment and the forceps, 2 mm.

Habitat : Kentucky (Packard), District of Columbia (Nathan Banks).

JAPYX AMERICANUS, sp. nov.

Head transverse, broader than long. Antennæ twenty-four jointed, segments one to five cylindrical, subequal ; the following segments thicker, spherical. Prothorax nearly as broad as the head, concave in front. Abdomen gradually broader behind, segments immaculate. Segments one to six rounded in the sides behind ; the seventh emarginate behind, posterior angles produced into stout spines, pointing inward ; the eighth segment equal to the seventh, subequal to the sixth, very slightly emarginate behind, posterior angles slightly produced, not spinate ; ninth segment one-fourth the length of the eighth, posterior angles slightly produced ; tenth segment and forceps subequal in length, together equal to the four preceding segments. Right arm of the forceps scarcely broader than the left, with two large tubercles on the inner margin, one just before the middle and the other beyond it ; in front of the larger tubercle the inner margin is convex with five smaller equidistant tubercles, between the larger tubercles the inner margin is straight with six equidistant tubercles, beyond the last tubercle the inner margin is concave with many small tubercles. The left arm is broadest at base, gradually tapering to the apex ; at one-third of the length from the base on the inner margin there is a large tooth, in front of and adjacent to this tooth are three smaller tubercles, which are as large as the larger tubercles of the right arm and with their apices broadly rounding ; beyond the tooth the inner margin is convex with nine feebly marked tubercles, giving a crenulated appearance ; beyond these tubercles the inner margin is simple.

Length, 14 mm. ; length of the antennæ, 5 mm. ; length of the abdomen, 10 mm. ; length of the last abdominal segment and forceps, 3 mm.

Habitat : Olympia, Washington State.

For the discovery of this interesting species science is indebted to Mr. Trevor Kincaid, of Olympia, Washington.

A third species of *Japyx* has been described from Mexico. It can be distinguished by its longer antennæ, consisting of from forty-five to forty-eight segments.

A NEW ASILID GENUS RELATED TO ERAX.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

Among the species heretofore referred to the genus *Erax* is a small group in which the first submarginal cell is divided by an oblique cross vein into two cells. The venation is similar to that of the genus *Promachus*, except that the foremost of the two apical submarginal cells is shorter, and the third vein curves forward to the costa before the apex of the wing, instead of curving backward to the hind margin beyond the apex. The examination of quite a large series of specimens belonging to this group proves that the characters above mentioned are constant, and as the genus *Erax* already contains a large number of species, it is desirable to separate as a new genus those species possessing these characters. For this group I propose the name *Efferia*, and would further characterize the genus as follows :—

Efferia, n. gen.—Third joint of antennæ provided with a distinct naked, terminal style ; wings having three submarginal and five posterior cells, the marginal, fourth posterior and anal cells closed ; third vein terminating in the costa before the tip of the wing ; front tibiæ destitute of a claw at the apex ; ovipositor of the female compressed and destitute of a circlet of spines at the tip.

Two species belonging to this group have been described from North America : *anomalis*, Bellardi (Saggio, II., 32) and *completus*, Macquart (Dipt. Exot., I , 2, 117). The last-named species has not been identified. My collection contains three apparently undescribed species, which, with *anomalis*, may be separated as follows :—

1.—Thorax destitute of a median longitudinal crest of nearly erect hairs 2
Thorax provided with such a crest ; bristles of the palpi black . . . . . *rava*, n. sp.

2.—Bristles of palpi, mystax and scutellum white 3
Bristles of palpi, scutellum, occiput above, and several in lower part of mystax, black . . . . . *anomalis*, Bell.

3.—Abdomen silvery-white pollinose, and with rather long white pile parted in the middle and directed outward . . . . . *candida*, n. sp.
Abdomen grayish-brown pollinose, and not with pile as above described . . . . . *pernicis*, n. sp.

Efferia pernicis, n. sp., ♂ . Black, the base of the tibiæ red. Pile and bristles of entire head yellowish-white, the pollen yellow. First antennal

joint nearly twice as long as the second and slightly longer than the third, style two and a-half times as long as the third joint. Pile of prothorax long, white, that of mesothorax very short, sparse, black, not forming a crest, that on the posterior part longer and partly white; dorsal stripes and spots indistinct, grayish-black; pile of pleura, legs and scutellum white, that on the abdomen short, sparse, not parted in the middle where it is largely black, elsewhere white; pollen of abdomen nearly uniform grayish-brown. Inner side of the front and hind tibiæ next the tips, and the under side of their first two tarsal joints, densely beset with rather short golden-yellow pile. Halteres pale brown. Wings hyaline, small cross-vein at middle of the discal cell, base of third submarginal cell at last third to sixth of distance between small cross-vein and apex of discal cell; costa not enlarged. Hypopygium shining black, but slightly wider near the apex than at the base, equal in length to the fifth and sixth abdominal segments united, its pile white, more dense below at the base.

♀ same as the ♂, except the genitalia; ovipositor slightly longer than the fifth, sixth and seventh abdominal segments taken together.

Length, 20 to 24 mm. Los Angeles and San Diego Counties, Cal. Two males and two females.

Efferia rava. n. sp.—♀. Same as *pernicis*, with these exceptions; Bristles of front, of upper part of occiput, on under side of antennæ, in lower part of mystax, and those of the palpi, black. Thorax with a median crest of rather long and nearly black hairs; the fan-like row of hairs in front of the halteres mostly black, pile of scutellum also black. Ovipositor but slightly longer than the sixth and seventh abdominal segments. Wings yellowish-hyaline.

Texas. A single female (Morrison).

Efferia candida, n. sp., ♂. Black, bases of tibiæ red. Pile and bristles of entire head white, a few bristles of the occiput sometimes black, pollen of head silvery-white. Pile of thorax short, sparse, black, not forming a crest, that behind and on the prothorax longer and mostly white; stripes and spots of thorax distinct, black. Pile of pleura, legs, scutellum and abdomen white, that on the abdomen rather long, parted in the middle and directed outwardly; abdomen nearly uniformly silvery-white pollinose, destitute of black spots; hypopygium shining black, but slightly wider near the apex than at base, slightly longer than the fifth and sixth abdominal segments taken together, its pile white. Front and hind tibiæ within next the tips, and under sides of their first two tarsal

joints densely short golden-yellow pilose. Wings hyaline, small cross-vein at middle of discal cell, base of third submarginal cell at last fifth of distance between small cross-vein and apex of discal cell; costa not enlarged. On the anterior part of the second abdominal segment are many rather large, transversely-elliptical punctures, and similar punctures also occur on some of the other segments. Antennæ similar in structure to those of *pernicis*.

♀ same as the ♂, except that the pollen of the abdomen is darker, and the pile is shorter and sparser; ovipositor as long as the fifth, sixth and seventh abdominal segments taken together.

Length, 20 to 25 mm. Los Angeles County, Cal. Six males and four females.

NOTES ON COLLECTING SOME OF THE SMALLER SESIIADÆ IN THE LONDON (ENGLAND) DISTRICT.

The one most commonly met with is *S. tipuliformis*, and is to be found sunning itself on the leaves of the currant bushes at the time when the fruit is about two-thirds grown, and on a bright sunny morning about 10 o'clock, or afternoon about 4 o'clock, one can easily take from six to twelve in one or two hours. Once I found them assembling, and took some thirty or forty in a very short time. It is a little difficult to procure the larvæ, as they feed in the two-year-old wood, and, as this is the fruit-producing part, it is better not to cut it while the owner is about, and when you can cut, I have found so many blanks that the bushes have suffered more than the gain warranted.

The next species commonly met with is our red-banded one, *S. myopaeformis*, feeding in the bark of apple trees (about six feet from the ground), and can generally be found in gardens where *Tipuliformis* is found. I have never seen this moth at rest, and though one can generally count on taking several in a morning, one must watch the trunks of the trees and find them flying round and round, evidently for depositing eggs; cutting out the larvæ without doing much damage to the tree is hard, as they feed just under the bark.

Our next commonest one is *S. culiciformis*. For this we must go to the woods where birch is common; so, taking the train down to Croydon, ten miles (about the end of April), a two-mile walk brings us to West Wickham Wood, one of our best in the South London district. We go through it till we find a part which was cut down two winters back;

here, having found some nice looking birch stumps with frass showing, we set to work with a saw to saw off the sides, and so find we have secured one or two larvæ or pupæ, and in a good afternoon's work may perhaps obtain twenty. These we take home and put on wet moss to prevent drying up, and with care may in about six weeks breed a good many. I have found putting them under a bell glass a good way. I have never taken this insect on the wing.

The next, *S. formicaeformis*, with its pretty claret-coloured wings, we find flying in the sun along the sides of the roads which intersect our osier beds in the Mitcham district (about eight miles out). This species seems on the wing all the day, and fifteen or twenty is a fair catch. The larvæ can be cut out of the osiers about April, but it is very risky, as the basket makers have a decided objection to their osiers being cut.

S. chrysidiformis, the handsomest of all our smaller Sesiiadæ, with its bright scarlet wings, was, until some twelve years ago, most rare, fetching as much as two and three pounds per pair, but about that time they found out how to take the larvæ. Starting from the London Bridge station, on the S. E. R., we take tickets for Folkestone (town station). Arriving there after about two and a-half hours' run, we turn towards the Warren (a sort of undercliff running along the shore for about three miles), and after a mile's walk we get on to the slopes closest to the sea. Having brought a good, sharp, two-inch chisel with us, we look round for roots of dock and sorrel; the former we find are very scarce, having been cleared off by collectors; the latter, however, are still common, and having selected a good strong one dig it up, and scraping part of the root away see signs of workings. We put the root into a small sack we have provided and then search for more. In the course of a day we get a nice lot together, and upon our arrival home plant them into boxes. As it is only April, and the imago will not be out till June, there is now nothing else to do but to keep them watered and cover over with muslin till about the end of May. One year, from three days' work in Folkestone Warren, I bred about 150 fine imagos.

S. cynipiformis, feeding in oak, is said to occur in Hyde Park, but I have never been able to find it there. However, I have obtained the larvæ commonly at Tilgate in early May by finding the trunks of large oaks which have been cut down two winters previous, then ripping off the bark the larvæ are found feeding in it. In England the trees are cut off only four or five inches from the ground, and the moths seem to prefer

these to the growing tree. There, however, appears plenty of sap to support the larvæ till full grown. The only trouble, having got the larvæ, is to prevent drying up till time of emergence.

S. ichneumoniformis. I have never bred and have only taken it very sparingly by sweeping the herbage along the edge of cliff at Eastbourne and Ramsgate. The most I ever took in a day was five.

S. sphegiformis (one of our rarest ones, which is taken every year), has to be cut out of the alder. About March we take train for Three-Bridges Station, thirty miles out on the Brighton line. Arriving there we are soon on the ground and examining the alder stems from one to four inches thick. When we find workings which would denote larvæ in the second year, we saw off just below and then again about eighteen inches higher, and if very lucky we may get from ten to thirty sticks in a day. These have to be kept on moist moss in tin boxes till the middle of June, when the moth appears. Having a nice ♀ quite fresh, we are off by the first train, and having put her in a collar box with muslin on each side, we hang it to a bough and sit down and wait events. Perhaps nothing for the first half hour, but what is that buzzing in front of the box? We get up quickly and see it is a fine ♂. We need no net; he is so intent that we hold our bottle just behind him and bottle him on the wing. By this means I took twenty-three in one day. The curious part is, I never saw them coming until they were quite at the box hovering, and also that an insect so quick on the wing should not fly off, even when the bottle is as it were all round it and only the cork to put on.

S. scoliaeformis was taken out of birch fairly commonly at Llangollen, Wales, some twenty years back, but was quite worked out then, and for some fifteen years no one had taken it. However, last year in Scotland I hear it has been taken fairly commonly.

S. philantiformis was added to our list only some ten years back. It was found by accident feeding in the common thrift on the sea coast in the west of England, but I have never taken it.

S. vespiformis and *S. andreniformis*, the two remaining of our smaller Sesiiadæ, are of the greatest rarity, and have only been taken singly.

Regarding *Tipuliformis*, in 1874 and 1875 I took and saw several in Mr. B. Gibb's garden, St. Catharine street, Montreal, among the currant bushes, and I should think it would be found in any of our old town gardens now.

LACHLAN GIBB.

A SUGGESTION AS TO THE IDENTITY OF CYCNIA DUBIA, WALKER.

BY HARRISON G. DYAR, ROXBURY, MASS.

In Vol. XXII., p. 120, of CAN. ENT., Prof. Smith calls attention to the fact that the above name awaits identification, and says: "There should be no difficulty in identifying this species, should it turn up." The moth was described by Walker as Cycnia, referred by Grote and Robinson to Phragmatobia, and lastly by Kirby to Estigmene (= Leucarctia). It has occurred to me that this form has already been turned up, and by Mr. Bruce, as described in Entom. Amer., Vol. III., p. 140, where it was shown to be a form of *Spilosoma virginica*. Compare the following descriptions:—

1. By Walker. "Female. Pale brown. Antennæ and legs with whitish tomentum. Thorax fawn colour, whitish behind. Abdomen somewhat ferruginous, with three stripes of black spots. Wings with two oblique, incomplete, indistinct, brown bands, composed of blackish spots. Forewings with whitish veins. Length of body, 5 lines; of wings, 16 lines. Hudson's Bay."

2. By G. & R. "Wings semi-translucent, brown or mouse colour; veins on both wings whitish above; eyes margined narrowly with white; legs shaded with whitish outwardly; abdomen with three rows of brown spots."

3. By Bruce. "Head, body and legs sooty brown, small black dorsal spots on body; all the wings brownish mouse colour. The veins on forewings distinctly white."

Mr. Bruce adds:—"If my friend had not preserved the eggs, and I had not reared the larvæ, this would certainly have been named as a new species, and would have been a standing puzzle to entomologists." If my surmise be correct, this has taken place.

C. dubia may be provisionally referred as follows:—

SPILOSOMA VIRGINICA, Fabr.

var. DUBIA, Walk.

1856—Walk., C. B. Mus., III., 682, *Cycnia*.

1868—G. & R., Tr. Am. Ent., Sc., II., 72, *Phragmatobia*.

1887—Bruce, Ent. Amer., III., 140, *Spilosoma*.

1890—Smith, CAN. ENT., XXII., 120, *Phragmatobia*.

1892—Kirby, Cat. Lep. Het., I., 227, *Estigmene*.

A NEW LAC-INSECT FROM JAMAICA.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

The lac-producing Coccidæ are usually referred to the genus *Carteria*, Signoret, but as this name is pre-occupied in Protozoa, Signoret (Bull. Soc. Ent. Fr., 1886) substituted for it the term *Tachardia*. The known species referable to this genus are five, namely :—

1. *Tachardia lacca* (Kerr.) India, on 43 species of plants of 18 natural orders (Watt, Dict. Econ. Prod. India, II., 1889, p. 409–412); British Guiana, on *Erythroxylon (Timehri*, Dec. 1890, p. 308).

2. *Tachardia larreæ* (Comst.), Arizona, on *Larrea.* (Rep. U. S. Dept. Agr., 1882).

3. *Tachardia mexicana* (Comst.), Tampico, Mexico, on *Mimosa.* (Rep. U. S. Dept. Agr., 1882).

4. *Tachardia melaleucæ* (Maskell), Australia, on *Melaleuca*, &c. (Tr. N. Z. Inst., 1891).

5. *Tachardia acaciæ* (Maskell), Australia, on *Acacia.* (Tr. N. Z. Inst., 1891).

To these may now be added a sixth, as follows :—

6. *Tachardia gemmifera*, n. sp., Kingston, Jamaica, on *Chrysobalanus icaco*, Linn.

Some months ago, Mr. H. Vendryes directed my attention to a Coccid which was damaging a Coco Plum in his garden, and kindly gave me some twigs with many scales upon them. These were evidently referable to a new *Tachardia*, which I call *gemmifera*, on account of the ruby-like prominence on the dorsum of the scale. The female scales (if the covering of lac can properly be so called) are subglobular, shiny, crimson-black, with a crimson ruby-like prominence on the centre of the back, best seen in somewhat immature examples. There are also one or two dorso-lateral prominences, more or less obscure. Sides with 4 or 5 keel-like folds. There is a conspicuous subdorsal aperture.

Length of scale, 5 mill.; diam., 5 mill.; alt., about 4 mill.

The scales are extremely hard, but will fracture if sufficiently pressed; sides of scale crimson by transmitted light.

The lac when heated melts to a substance about the colour of guava jelly, which turns crimson on the application of caustic soda: this colour-change is most marked.

The *female* is very broad oval, almost circular, posteriorly bluntly angled. On breaking open a scale, it is seen not to be completely filled

by the body of the female. In the cavity, besides the ♀, is a quantity of white secretion, breaking into short strap-shaped fragments. None of this appears externally. There are also more hair-like white fragments, some of which may be seen protruding from the produced tubular organs. This white secretion is no doubt analogous to the ovisac, as in it I found larvæ.

The *male scale* is cylindrical, rather over 1 mill. long, dull dark crimson. There is an anterior dorsal ridge, leading to a mid-dorsal swelling. Hind end truncate. Front end with a largle hole, where the ♂ has escaped; or, when the ♂ has not escaped, this is covered by a flat lid or cap.

The *larvæ*, as observed in numbers on the bark of the twig, are crimson, elongate, with the segmentation distinct; sides with a longitudinal furrow. Caudal hairs about ⅔ length of body, free from secretion. These hairs arise some distance apart, and immediately caudad of each is a small elongated process or tubercle; between these, and terminating the body, is a short, white, opaque caudal stylus, which is distinctly bifid, and no doubt consists of the anal hairs covered by secretion. This arrangement is suggestive of *Dactylopius*.

The last joint of each antenna bears two long hairs, longer than the whole antenna; this is also the case with the larva of Maskell's *Carteria melaleucæ*.

The claws have short knobbed digitules; and the tarsus presents the usual pair of knobbed hairs, which are very long. The tibia seems quite as long as the femur, and the tarsus is *very* little shorter than the tibia. There are some short stiff hairs about the base of the legs.

Maskell remarks (Indian Mus. Notes, Vol. II., No. 1, p. 62), on the almost invariable rule that in larval Coccidæ the tarsus is longer than the tibia. This, however, is not the case in *Erischiton cajani*, Mask.; and a further exception is presented by *Tachardia*, in which, at least in *T. gemmifera* and *T. melaleucæ*, the tibia of the larva is slightly longer than the tarsus.

On placing some of the ♀ scales in soda, I found fragments of a Chalcidid parasite, which seems to belong to the genus *Aphycus*. The antennæ present the following characters: Scape long, with an apparent false joint near its base, its upper part zoned with brown; pedicel about twice as long as broad; the following 6 joints moniliform, increasing regularly in size, the first three joined together, the last three more separated and bearing whorls of hairs. Club large, brown (the joint just

before it is colourless), and consisting of three joints. The middle tibia has two brown zones, and a large thick spur. The ovipositor projects but slightly beyond the abdomen, and bears on each side of its tip a small brush of hairs.

Tachardia gemmifera must, I think, be regarded as an injurious insect, since it affects the Coco Plum rather seriously. The lac is so small in quantity that it would probably not pay to collect and prepare it.

Institute of Jamaica, Kingston,
Jamaica, Dec. 27, 1892.

NOTES ON TAXONUS NIGRISOMA AND T. DUBITATUS.

BY J. G. JACK, JAMAICA PLAIN, MASS.

The following notes of observations of some stages of these two little saw-flies are fragmentary and incomplete, but they are now given as they may be of some assistance to others working upon this group of insects.

Taxonus nigrisoma, Nort., Larva.—The fully grown larva is cylindrical, and 10 to 12 millimeters long. It is of a pale green colour above, very slightly darker towards the sides above the spiracles, the spiracle line being marked by very minute dark dots one to each segment; and the under side (including the abdominal or prop legs) is of a dull whitish colour.

The upper part of the head is dark brown, shading from pale brown to whitish on the face and whitish beneath.

The eyes are black and prominent; antennæ small, six-jointed and light brownish coloured; and the mouth parts dark.

The thoracic legs are of a dull white colour, generally bearing more or less easily distinguishable narrow smoky brown or dark markings on the outer side of the apical segments, the strong, simple, terminal claws usually having a dark brown or black tip.

When they ceased feeding at full growth the larvæ abandoned the leaves of their food plant, which was *Polygonum Muhlenbergii*, Watson, and prepared for pupating by boring into the green stems of the food plant or sometimes into some such substance as partially decayed wood if it happened to be in the vicinity. In these burrows pupation takes place without the formation of any cocoon. The pupa is uniformly yellowish-white in colour, the dark eyes showing prominently.

Within a week or two after entering their burrows the insects emerge as saw-flies. Both larvæ and pupæ were very much parasitized by

Pimpla pterelas, Say, of which species I have bred both the males and females, the latter being by far the most abundant.

Apparently, the male imago of *Taxonus nigrisoma* has not been described, but it does not differ from the female in general appearance, except by its much smaller size.

Collected and observed in the Arnold Arboretum, at Jamaica Plain, Mass., in June, 1890: the saw-flies noted as emerging from the stems of the Polygonum about June 30 and some days later. For the determination of the food plant I am indebted to Prof. William Trelease.

Taxonus dubitatus, Nort. The larvæ of this species are of a light grass-green colour, so that it is not an easy matter to detect them when resting on the fronds of the Sensitive Fern (*Onoclea sensibilis*) upon which they feed. I have bred the saw-flies from the larvæ, but made no critical notes as to peculiar markings, if any exist. There are certainly no spots or markings large enough to be noticeable by a casual look, the whole effect being green.

The saw-flies of this species appear as early as the latter part of May and the beginning of June, and are also very abundant about the fern early in July, so that there must be at least two, and possibly more, broods. The males were seen in greatest abundance.

When at rest both males and females fold their legs and antennæ, and drop to the ground on very slight alarm.

Collected and observed at Jamaica Plain, Mass., in 1890.

NOTE ON COPIMAMESTRA AND EULEPIDOTIS.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In discovering a North American representative ot the European *Brassicæ*, I proposed for this latter and our *Occidentis* the generic title *Copimamestra*, based on the tibial claw. In the Philadelphia List the term *Barathra* is resuscitated out of Hübner's Verzeichniss, p. 218, for the genus, but incorrectly. Hübner refers two species, *Brassicæ* and *Albicolor*, to his genus, and I was free to use for one of them the new term. I need not state that Hübner took no note of the structure of *Brassicæ*, and that *Albicolor* differs structurally. I must therefore insist that *Copimamestra* be used for the two species *Brassicæ* and *Occidentis* under the laws of scientific nomenclature.

In the CANADIAN ENTOMOLOGIST, when discussing Hübner's figures of North American Noctuidæ in the Zutraege, I drew attention to his

illustration of *Eulepidotis alabastraria*, figs. 311, 312, which he states to be from Savannah, Georgia, l. c. 22. It is probable that the locality is incorrect, and that this species is not found in North America. I have identified it in the Bremen Museum from South America. The insect is not a Geometrid, but belongs to Guenée's genus *Palindia*, and is described in the Spec. Gen., VI., 275, from Brazil. It seems, therefore, likely that Hübner's locality is incorrect, while Guenée makes no note upon the subject.

DESCRIPTIONS OF CERTAIN LEPIDOPTEROUS LARVÆ.

BY HARRISON G. DYAR.

(Continued from page 160.)

Ichthyura vau Fitch.

Egg.—The colour of the unhatched eggs is deep purplish-pink, pale around the bottom; slightly shining.

First stage.—Head bilobed, bearing a few hairs; shining black; width .45 mm. Dorsum broadly bluish-white, except the black cervical shield and anal plate and joints 5 and 12, which latter are hardly enlarged, coloured vinous-brown. Whole lateral area also brown but paler, and broken into patches. Feet black outwardly. Hair fine, very long laterally, pale, darker dorsally, arising singly from black conical tubercles with the normal arrangement. The body is minutely dotted with brown (under a half-inch objective) and there are no hairs present except those from the tubercles. The hairs are simple, not glandular nor branched. The cervical shield is elongated transversely, with a central constriction.

Second stage.—Head bilobed, median suture deep at vertex but shallow in front; head flattened before, slightly wider than high. Colour, shining black, with some hairs; width 7 mm. Body flattened, wider than high, the dorsal region pale yellow, with the tubercles of rows 1 and 2 darker yellow and three narrow brown lines. The enlarged dorsal portion of joints 5 and 12 and the whole lateral area is deep vinous-brown. Cervical shield and anal plate blackish, but not so distinct and corneous as before. From the tubercles arise singly long hairs, and many others arise from little elevations on the body; but these are much shorter.

[We regret that the above note, completing the description, did not reach us in time for insertion in its proper place in the June number.—Ed. C. E.]

CORRESPONDENCE.

HEPIALUS 4-GUTTATUS.

Sir: The statement on page 125 of CAN. ENT. for May, that *4-guttatus* is a synonym of the typical *argenteomaculatus*, is incorrect. The type form of the latter is the smaller not pinkish form, and is the *argenteomaculata* of the Reports on Ins. Inj. to Vegetation. The form *4-guttatus* is apparently that figured in "Lake Superior" by Agassiz. So far as I am able to judge from the short description, in which the colour seems to coincide with *4-guttatus*, the writers have apparently redescribed my *4-guttatus*.

A. R. GROTE.

ARGYNNIS ASTARTE.

Sir: It may interest your readers to know that *Argynnis astarte* (= *Victoria*, W. H. Edw., CAN. ENT., XXIII., 198, *fide* Strecker, Ent. News, Nov., 1892, p. 218) Double-Hew., which was rediscovered last year by Mr. Bean in the Rocky Mountains near Laggan, is, as far as I can judge from the single specimen he has been good enough to send me, a very near ally, and perhaps not separable from *A. amphilochus* of Menetries, a species which appears to be either very rare or very local near the head waters of the Amur river in Siberia. My specimen is smaller and paler than *Amphilochus*, but every marking seems to be identical in position. It is quite probable that when the northern extension of the Rocky Mountains has been explored, this species will be found at lower elevations, as I learn from Mr. Bean that he took it at 8,500 feet.

W. J. ELWES, Colesborne, Andoversford, Gloucestershire, England.

P. S.—I may add that I have still spare copies of my revisions of the genera *Argynnis* and *Erebia*, which I shall be glad to send to anyone who wants them in Canada or the States.

LITHOPHANE ORIUNDA.

Sir,—On the 24th of Sept., 1892, I found, in the vicinity of London, a moth new to me. It was resting in an upright position, on the stalk of a weed, quite fresh, as if it had but recently emerged. Its thoracic crest and tufts stood out conspicuously, which, with its gracefully curved and pointed wings, at once suggested a *Lithophane;* but its colour and markings were so different from what I had been accustomed to in that genus, that I hesitated to decide upon it as such.

In November I sent it with other material to Prof. J. B. Smith for

identification. He pronounced it to be a *Xylina* without doubt, but retained it for further investigation. On the 6th of March, 1893, I received a letter from him conveying what was to me the gratifying information that it had proved to be *X. oriunda*, on comparison with a typical specimen in the U. S. National Museum. I had long desired to obtain a specimen of *Oriunda*, and made inquiries for it of those with whom I exchanged, but none of my correspondents had ever met with it. *Lithophanes* have been one of my favourites, and my interest in this one was specially awakened by reading in the CANADIAN ENTOMOLOGIST, Vol. 7, p. 188, a quotation made by Mr. Grote from a letter received by him from Mr. Norman, where, after giving the names of the Lithophanes he had taken at Orillia, he adds, "and that lovely *Oriunda* a single specimen," that quotation constituting the whole of my knowledge of the insect until recently.

The original description by Mr. Grote is to be found in the Bulletin of the Buffalo Society of Natural Sciences, Vol. 2, p. 160, which I copy in full for the benefit of those of your readers who may not have the volume to refer to :—

"LITHOPHANE ORIUNDA, Grote. Allied to *L. Bethunei*, and belonging to the typical group of the genus. Distinct, intense. even, somewhat purply-brown. Forewings concolorous, with the costal edge shaded with whitish to the t. p. line, and interrupted by oblique brown streaks indicating the transverse lines. Reniform and orbicular spots more or less shaded with whitish, shaped as in *L. Bethunei*. Claviform distinctly outlined in black, large. Subterminal line alone distinctly indicated by pale points. The median dentate lines more or less lost in the ground colour. Veins terminally indistinctly black marked opposite pale dots on the brown dentate fringes. Secondaries dark fuscous, with a warmer shade on the fringes. Beneath paler, shaded with reddish, with a distinct discal spot on the paler hind-wings and a common line. On the primaries the pale costal dots are evident on both surfaces. Expanse, 34 m.m. Canada, Mr. Wm. Saunders, No. 960.

"Colour like *L. ferrealis*, but darker, with the subterminal line more even, the orbicular smaller, and the costal discoloration paler and more distinctly contrasted and limited."

This description is dated Sept., 1874.

No mention is made of the number of specimens the description is taken from, and Prof. Saunders does not now recollect the number of specimens captured by him, but knows that they were but few; perhaps not more than three. It would be very interesting if the number of speci-

mens to be found in collections could be known. So far as my information goes, it still remains an exclusively Canadian species.

J. Alston Moffat.

UNIDENTIFIED BOMBYCIDS.

Sir: Concerning Prof. Smith's note on page 164 of June Can. Ent., it is, perhaps, unprofitable to enter into a discussion as to whether the generic names from Hübner's Tentamen should be adopted or not; but, as far as our Bombyces are concerned, there are only four of these names with which we have to do. They are: (1) *Nycteola*, Hubn., for *Sarrothripus*, Curt.; (2) *Hypercompa*, Hubn., for *Zoote*, Hubn. (Verz.), for *Euprepia caja*, Linn.; (3) *Dasychira*, Hubn., for *Dasychira*, Steph.; (4) *Melalopha*, Hubn., for *Ichthyura*, Hubn., (Verz.). The third of these introduces only a change in the name of the author; *Euprepia* cannot stand for *caja* anyway, since it must be used for the species of "Arctia" according to Mr. Kirby's method of fixing types, which seems eminently proper. The name *Arctia*, Schrank, has for its type *A. villica*, Linn., replacing *Epicallia*, Hubn. Our species, *E. virginalis*, by the way, is not congeneric with *A. villica*, nor with *C. dominula*, as Kirby puts it; but it seems hazardous to change it till the European genera have been revised. If we discard *Hypercompa* (Hubn., Tent), for *caja*, the name *Zoote* (Hubn., Verz.), comes next in order. Thus there are only two of the Tentamen names which supplant names now in use, and only one which supplants a name by a different author. It seems to us more satisfactory to adopt these names and end controversy about them, especially as they have been adopted by Kirby in his work where the Bombyces of the world are brought together in a uniform system. We dislike to depart from this standard without conclusive reason.

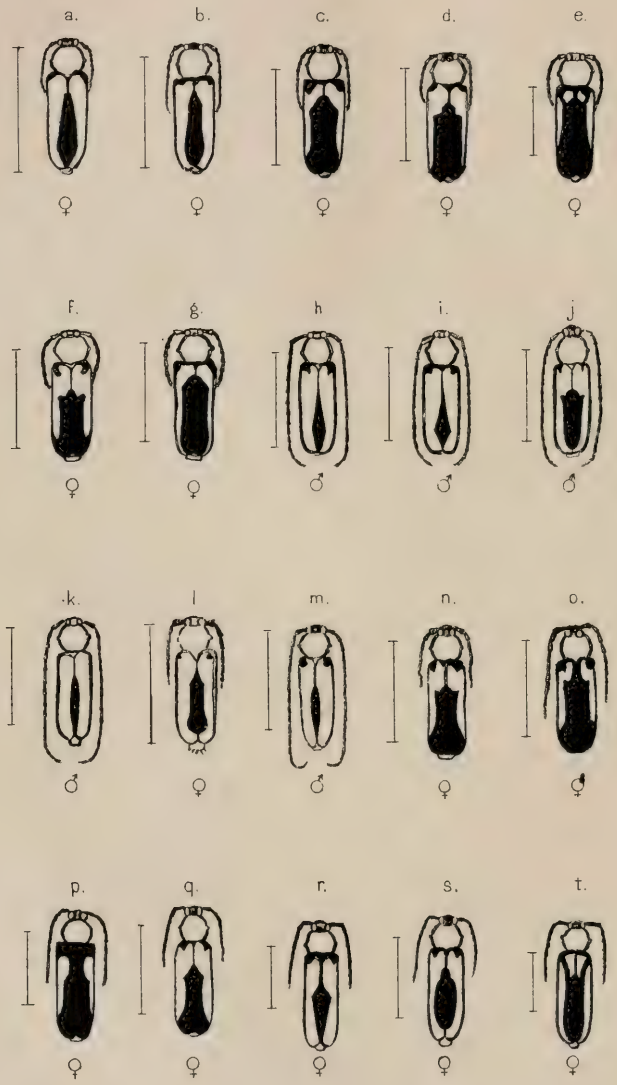
Harrison G. Dyar.

AGASSIZ ASSOCIATION.

Sir,—The Henry Edwards Entomological Corresponding Chapter of the Agassiz Association invites entomological students who read this notice to join its ranks. Members are expected to keep each other informed of the progress of their work in special lines of study, and to contribute to the published reports. During the winter one or more courses in Elementary Entomology will be conducted. The initiation fee is 50 cents. For further particulars, address the Secretary,

William L. W. Field, Guilford, Conn.,
(After Oct. 1, Milton, Mass.)

Mailed July 7th.



H. F. W. del

The Sabiston Lith. & Pub. Co., Montreal

The Canadian Entomologist.

VOL. XXV. LONDON, AUGUST, 1893. No. 8.

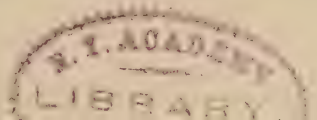
SOME INTERESTING COLOUR-VARIETIES IN THE GENUS CROSSIDIUS.

BY H. F. WICKHAM, IOWA CITY, IOWA.

While engaged in the re-arrangement of some boxes of Cerambycidæ recently, the peculiar modifications of the ordinarily very simple pattern of coloration in the genus *Crossidius* brought about the desire to see to what extent and under what circumstances certain of these modifications were carried on or existent. The results of the studies ensuing thereupon are presented in the present paper.

The pattern which may be regarded as the typical one, and upon which all the others are built, either by simple addition or subtraction, is as follows :—Head black, thorax black with yellow side margins, elytra yellow with the humeri and a large elongate common sutural spot black. I do not wish it understood, however, that this is to be regarded as the original pattern from which the others have been evolved through the processes of natural or sexual selection—only as a common plan of coloration, and one which forms a convenient standard of comparison.

In habit the beetles are diurnal, frequenting flowers of golden-rod and other yellow-flowered Compositæ, more especially in the arid regions of the United States and southward. In our faunal limits the genus is found from Montana and Oregon to Texas and Southern California, spreading over a vast extent of territory, and one of great differences in climatic and atmospheric, as well as of geologic characters. Under these circumstances we might well expect to find the genus composed of either many more or less closely allied species, or one or few very variable ones. My own experience goes to show that, in this group, those species of wide distribution offer many interesting variations, and to bring some of these before the reader I have prepared the accompanying plate, wherein the body and antennæ of the insects are represented in a conventional manner, and all accuracy of delineation confined to the points under discussion—the elytral pattern.



That the yellow ground colour of most of the species is of protective value, and that the black markings aid in this object by breaking the continuity of outline, I think no one will contradict who has seen these insects in their natural homes, whether he be a believer in any of the theories advanced to account for this phenomenon or not. That the variation within specific limits is also very great will not be denied by one who has seen cabinet series from various parts of the country; but the meaning of this variation and its co-relations, if such there be, with the multitudinous incidents of food, size, habitat, altitude, temperature and moisture, are not to be made out at a sitting, but will take years of thought and labour to demonstrate. The few facts, for the bringing forward of which the present paper was written, may none the less serve a useful purpose in aiding those whose investigations are of a parallel nature to keep a sort of check on their own investigations, or to find that the work of others may help to bear out the conclusions arrived at in their own.

The figures *a* to *j* of the accompanying plate represent some of the forms shown by *Crossidius pulchellus* from southern localities. It will be noticed that the lightest forms, *h* and *i*, are both males, while the darkest, *c*, *d* and *e*, are females; the male shown at *j* is, however, darker than the females shown at *a* and *b*, the pattern resembling more closely that of *g*, though the males with fusiform sutural blotch, *h* and *i*, are lighter than the correspondingly marked females *a* and *b*; this is true also of the male with shield-shaped spot *(j)*, and its corresponding females, *c*, *d*, *e*, *f* and *g*. The females, among themselves, show an increase in comparative size of the dark spot with decrease in actual size of the insect, as will be seen by comparisons of the hair-lines indicating the length of each specimen figured. The inference to be drawn here is that the female tends to the possession of increase of black markings over those of the male, and that the smaller specimens are likely to be darker than the larger.

Figures *q*, *r*, *s* and *t* are of specimens which have been referred to *C. hirtipes*, but which I am inclined to consider simply a small form of *C. pulchellus*, since they do not agree with the description of the former species. These are all females, and do not bear out well the conclusion which would seemingly be justified by the preceding series that the small specimens are darkest, since *r* is a lighter form than the larger *s*. At *t* is shown a curiously marked specimen in which the humeral spot is prolonged backward, connecting with the sutural mark at what is, in most specimens, its antero-lateral angle. This may be compared with fig. *e*

where a somewhat similar conjunction is brought about, not so much by the prolongation of the humeral spot as by the extension forward of the sutural patch.

Figure *k* represents a form of coloration sometimes seen in the male of *C. longipennis*, Casey, of which species a series of fifty specimens, all from Albuquerque, New Mexico. lies before me. Of these only two of the males are so heavily marked with black as the figure, while all but two of the females are darker, the majority tending towards *a* (but lacking the humeral spot), while one is almost as dark as *q*. In this species, as in *pulchellus*, the females are the more heavily marked with black, but the size of my specimens is so constant that no correlation can be traced between size and colour. It may be worthy of remark, however, that the specific pattern of coloration involves much less black than that of *C. pulchellus*, while the actual size of the insect averages much greater—an indication of a tendency in large species in this genus to become light-coloured as well as large individuals of some of the species.

At *l* is shown a specimen of *C. intermedius*, which will illustrate the pattern of coloration of the only specimen I possess. It differs from most of its congeners in having pale legs and antennæ, and inhabits the drier portions of the southern plains in the same localities, and with the same habits, as *C. pulchellus*, though the range is probably much less extended.

C. nitidicollis, Casey, is represented by figures *m* and *n*, and is found in the neighborhood of Tucson, Arizona, and on the foothills of the mountains near by. It will be noticed that the male shows very little black, while the female is quite dark, almost exactly resembling fig. *f* of *C. pulchellus*. Here we find the female, as usual, darker than the male.

In the figures *o* and *p*, which show the markings of *C. discoideus*, a red and black species, is noticed an extension anteriorly of the sutural mark, which here reaches the base of the wing covers, with, in one case, a corresponding increase of the humeral spots which have been spread over the whole base of the elytra, and become confluent with the sutural blotch. Both specimens are females, so no sexual comparisons can be made, though the small specimen is the darker. My specimens are from the high mountains of Colorado (Cockerell) and from Williams, Arizona, the latter place at an altitude of between 6,000 and 7,000 feet.

The results of some researches regarding melanism in insects have lately been published by Mr. J. W. Tutt, of London, England. He believes that moisture is the chief excitant cause of melanism, and has

offered proof to show that among the British lepidoptera the darkest forms are commonest in the more humid parts of England. Given an excitant cause, he shows that as moisture in the atmosphere tends to darken the soil, trees and other natural objects, natural selection would, if not interfered with by opposing forces, tend to perpetuate the melanic forms. This line of thought has suggested to me the desirability of making some inquiries regarding the climatic conditions of the different regions from which my own specimens come. A request for figures stating average annual precipitation has at once been acceded to by Prof. Mark. W. Harrington, Chief of the U. S. Weather Bureau, who has kindly sent me the appended statistics:—

Annual precipitation at	Albuquerque, New Mex.,	7.19 in.	May to Oct ,	5.42 in.
"	"	Helena, Montana,	13.22 in.	"	" 7.90 in.
"	"	Flagstaff, Arizona,	25.95 in.	"	" 9.12 in.
"	"	Prescott, Arizona,	17.06 in.	"	" 8.50 in.

In most of these cases the observations have extended over a number of years, but the record for Flagstaff, Ariz, has been kept for only seventeen months, and Prof. Harrington writes me that it may be too high an average. My object in getting the figures for the months of May to October (inclusive) is this: If the action of moisture on the colours of insects be purely physiological, it would act chiefly, no doubt, while the insect was growing,—that is, through the active part of the larval stage, extending through the warmer months of the year; if, on the other hand, it acts indirectly by bringing the tints of the insect, through the work of natural selection, more closely in harmony with the darker colours with which this wet weather would surround it, it must nevertheless act during these same months.

While my paper does not deal exclusively with any one species, those treated of are closely allied, and on this ground it may prove profitable to make a few comparisons.

Fifty specimens of *C. longipennis* from the driest of these points—Albuquerque, New Mexico—show thirty-two males, none of which have more than a very slender line of black along the suture, and eighteen females, most of them coloured like *h*, several as light as *k*, and only one as dark as *b*. *C. testaceus*, from the dry regions of Southern California, is also notable from its lack of black markings. I found *C. longipennis* abundant upon golden-rods (*Solidago*), which had a very solid head of

bloom, without the reliefs of light and shade thrown by the more open inflorescense of the yellow-flowered plants on which my other species were chiefly taken. Dr. Leconte records *C. testaceus* from *Baccharis* without specifying more definitely.

Six specimens of *C. pulchellus* from Williams, Ariz., are of a rather dark form, such as shown by *g* and *d*, with the exception of two males which are somewhat lighter, as *h*, and one darker female, like *e* Four males from Peach Springs and Seligman are a very little lighter than *h*, while two females from the same localities are darker than the males, but not quite as dark as the Williams female. Three examples from Albuquerque are about the same as the Peach Springs specimens. A series of nineteen specimens from Helena Mon., averaging much smaller than those of other localities, are of a type very nearly the same as the Williams specimens, so far as regards the extent of black markings.

Summing up the evidence, then, we find:

1. Light specimens *(C. longipennis)* at Albuquerque, where the precipitation is 7.19 inches.

2. Darker ones *(C. pulchellus)* at Peach Springs and Seligman, where it is about 17. inches.

3. Still darker ones at Williams, where it is about 25.95 inches.

4. Specimens about the same as these last from Helena, Montana, where it is about 13.22 inches.

Now we have to reconcile with it, if we are to accept Mr. Tutt's theory at all, the phenomenon of specimens from Helena, with a precipitation of 13.22, presenting a phase of coloration as dark as those from Williams, with an annual precipitation of 25 95 inches. This, however, is not a great difficulty, since I have before mentioned the fact that the Helena beetles average much less in size than the more southern ones, and here I think it quite possible that we have the keynote to the whole thing. Mr. Tutt has already* adduced proof that some forms of disease produce melanism, and it has occurred to me that this species *(C. pulchellus)* having its metropolis in the south, where comparatively mild winters prevail, may find it a hard struggle to exist on the plains of Montana, where

*Melanism and Melanochroism, p 44 *et seq.*

the winters are of exceptional severity. The consequent weakening of the individuals by this undue exposure may produce a stunted and debilitated race, and the effects of this debility be shown in the lack of the bright yellow pigmentation so characteristic of the forms from the dry, warm regions of the South.

I am far from thinking that all has been written upon the subject of the variation in *Crossidius* that the occasion offers, but space has its limits and the material is too scanty to more than indicate in what direction we may look for the explanation of some of the phenomena presented. The data regarding precipitation in the different localities even cannot entirely be relied upon, as I have had to apply the average taken at Flagstaff to Williams, which is but few miles distant, and at very nearly the same elevation. In the same way it has been necessary to take that given at Prescott as approximately correct for Peach Springs and Seligman. However, I hope the article may attract the attention of more of our American students of entomology to a fascinating branch of the science, and that we may soon see in this country a number of workers who will follow out the lines of investigation suggested by our English brothers, and for the furtherance of which they have established a new magazine† especially devoted to the discussion of variation and its manifold causes. Most of my own work in this article has been suggested by the writings of Mr. Tutt, and to his works I would refer those who care to follow up the subject and learn, in a reasonable compass and without the mass of irrelevant matter which encumbers some other recent works dealing with the speculative side of entomology, what new fields of investigation may be opened up to those who like to know the histories of their insects as well as their names.

EXPLANATION OF PLATE.

Figs. *a* to *j*, *Crossidius pulchellus*, southern forms.
Fig. *k*, " *longipennis*, Casey.
Fig. *l*, " *intermedius*, Ulke.
Figs. *m* and *n*, " *nitidicollis*, Casey.
Figs. *o* and *p*, " *discoideus*, Say.
Figs. *q* to *t*, " *pulchellus*, Lec., northern forms.

†The Entomologist's Record and Journal of Variation.

NOTES ON TWO SPECIES OF TENTHREDINIDÆ, FROM YOSEMITE, CAL.

BY HARRISON G. DYAR, ROXBURY, MASS.

Schizocerus tristis, Cress.

var. FUMIPENNIS, *n. var.*

Eight examples bred from larvæ in the Yosemite Valley differ from Mr. Cresson's description in having both wings uniform smoky blackish, about as dark as the hind wings of *Hylotoma scapularis*, Klug. In the ♀, the pale parts of the legs are not white, but of an obscure sordid whitish, tinged with brown, and not contrasting with the black body parts; the abdomen is obscurely banded with brown between the segments.

Length of ♀, 6 mm.; ♂, 5 mm.; expanse of wings, ♀, 13.5 mm.; ♂, 11 mm.

Larva.—Head rounded, wider than high, the mouth parts pointed; clear green, shaded with black across the middle; ocelli black, mouth brownish; width, 1 mm. Thoracic feet large, the abdominal ones small, present on joints 5-10 and 13 (10 pairs in all). A slight subventral ridge; body transversely creased and covered with round, smooth, concolorous, wart-like elevations, uniform green, the dorsal vessel showing darker by transparency; a stigmatal row of black dots. The anal plate terminates in four short pointed projections tipped with black, and there are two others below the anus. Thoracic feet dusky. Length of larva, about 10 mm.

Cocoon.—Formed on the back of a leaf: oblong, rounded, symmetrical, composed of coarse yellowish silk of loose and irregular texture, not compact enough to be opaque.

Pupa.—Eyes prominent, cases free, the wing cases small; abdomen cylindrical, slightly tapering; colour clear green, the legs colourless, eyes black and two blackish shades on the thorax, as well as at bases of wing cases.

Food plant—*Hosackia grandiflora*, Benth.

LABIDA OPIMUS, Cress.

A ♀ example differs considerably from Mr. Cresson's description :—

var. BIGEMINA, *n. var.*

Head black; clypeus, labrum, mandibles (except at tip), palpi, lower half of cheeks, and elongate oval spot resting on the insertion of

each antenna and tip of basal joint of antenna outwardly, greenish yellow. Thorax black, the prothorax, tegulæ, two wedge-shaped bands along the parapsidal grooves, scutellum, centre of metathorax above, and a large angular spot on pleura, also yellow. Legs yellow, except the bases of coxæ, the tips of hind femora, tips of all the tibiæ outwardly and the tarsal joints, especially toward their tips, which are black. Wings smoky brownish-hyaline, irridescent, nervures black, the basal part of stigma and costa adjoining stigma yellowish. Abdomen greenish-yellow above and below, except the basal half of basal plates, a triangular spot on basal part of each dorsal abdominal segment, except the last, and ovipositor sheaths, which are black. Length, ♀, 11 mm.; expanse, 22 mm. The pair of spots between the eyes and second pair on the front part of mesothorax are conspicuous.

FITCH'S TYPES OF N. A. MEMBRACIDÆ.

BY F. W. GODING, M. D., PH. D., RUTLAND, ILLINOIS.

(Continued from page 172.)

No 3123 is *Ophiderma flava*, Godg.

No. 4416 is the type of *Thelia cratægi*, Fh.

No. 1875 is the type of *Ceresa brevicornis*, Fh. The brief description given by Fitch is correct, but not sufficiently complete. Good characters are present for separating it from its congeners.

The species labelled *Thelia Robiniæ* is *T. turriculata*, Fh., and that labeled *Smilia betulæ* is *S. camelus*, Fabr. Fitch's manuscript name *Zuela* is what is now known as *Stictocephala*, Stal. The descriptions of the species of this family, published in Emmons's N. Y. Report, were written by Dr. Fitch, as is stated by Emmons in a foot note, and there is no valid reason for crediting such species to Emmons. Fitch described the species and preserved the types which are now in the collection of the National Museum; consequently, his name should be attached to all such species whenever reference is made to them. While Fitch depended largely on the distribution of colours and shape of the crest of the prothorax, yet he gave some reliable characters which are of use in identifying his species. The crest immediately after the last moult is very soft and easily mutilated, and many species might be made from the eggs of a single female were this character depended upon. It should be used only with other and less variable characters.

SYNOPSIS OF THE DIPTEROUS GENUS THEREVA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table contains all the species of Thereva known to me as occurring in this country north of Mexico. *Thereva tergissa*, Say. (*corusca*, Weid.), and *T. crassicornis*, Will (*non Bellardi*), belong to Psilocephala. *Thereva nigra*, Say., is a true Thereva. *T. albiceps*, Loew., is evidently the same as *albifrons*, Say; and *gilvipes*, Loew., is the other sex of *flavicincta*, Loew., as that author suspected at the time of describing these two forms. Walker's and Macquart's species have not been identified, nor could this be done with any degree of certainty except by an examination of the type specimens.

The table is as follows :—

1.—Antennæ black 3

Antennæ yellow; California species 2

2.—Pile and bristles of head and thorax wholly whitish, knob of halteres yellow, front of female wholly opaque ..*semitaria*, n. sp.

Pile and bristles of head and thorax largely black, knob of halteres black, front of female with a shining black spot .....*fucata*, Loew.

3.—Femora largely or wholly black 5

Femora yellow, knob of halteres black, front of female with one or two shining black spots 4

4.—Front of female with two shining black spots, front of male destitute of black pile .....*duplicis*, n. sp.

Front of female with only one shining black spot, front of male with many black pile .....*flavicincta*, Loew.

5.—Knob of halteres black 8

Knob of halteres yellow or white, front of female destitute of shining black spots 6

6.—Front of female with two large, velvet-black spots, apices of femora black 7

Front of female destitute of such spots, apices of femora broadly yellow, cross-veins of wings not bordered with brown. .....*candidata*, Loew.

7.—Stigma dark brown, cross-veins bordered with brown ..*otiosa*, n. sp.

Stigma pale yellow, cross-veins not bordered ..... .*vialis*, O. S.

8.—Front of female partly shining black..... 9
Front in both sexes wholly opaque and covered with pollen.....11
9.—Abdomen of female opaque on the first six segments, front with two shining black spots.....*Johnsonii*, n. sp.
Abdomen of female largely shining.....10
10.—Front of female with a shining black spot reaching the lower ocellus; pollen on sides of front extending less than half way from each eye to lower ocellus.....*strigipes*, Loew.
Front of female having the lower half shining, the upper half covered with pollen.....*hirticeps*, Loew.
Front of female wholly shining black, except each lower corner .....*nigra*, Say.
Front of female with only one shining black spot; pollen on sides of front nearly or quite reaching the lower ocellus..*frontalis*, Say.
11.—Pile of front largely black.....13
Pile of front wholly white, front of female destitute of large, velvet-black spots.....12
12.—Bristles of occiput black, eighth abdominal segment in the female shining black, stigma dark brown.....*albifrons*, Say.
Bristles of occiput whitish, eighth segment in the female covered with pollen, stigma pale yellow.....*novella*, n. sp.
13.—Wings hyaline, the cross-veins not broadly bordered with brown..14
Wings brownish, the cross-veins broadly bordered with darker brown .....*comata*, Loew.
14.—Third joint of antennæ unusually short, inverted pyriform, the first joint very robust.....*melanophleba*, Loew.
Third joint of antennæ not unusually short.....*melanoneura*, Loew.

Thereva semitaria, n. sp. ♂ black, the antennæ, palpi, knob of the halteres, posterior margins of the second and third abdominal segments, hypopygium, femora, tibiæ, except the tips, and base of tarsi, yellow, the femora sometimes brown. Head and entire body whitish pollinose, the entire pile white, the bristles, except those of the legs, yellowish-white. Third antennal joint as long as the first and nearly twice as broad, being three fourths as broad as long; style one-third as long as the third joint. Thorax not distinctly vittate. Wings grayish-hyaline, the costal margin usually a darker gray, veins largely yellow, very narrowly bordered with brown, stigma dark brown, fourth posterior cell closed and short petiolate.

♀ same as the ♂, except that the pollen on the upper part of the front is more yellow, and the eighth and ninth abdominal segments are shining yellow, posterior margins of the other segments also more or less yellow.

Length, 8 to 11 mm. Southern California. Eleven males and four females, in April and May.

Thereva duplicis, n. sp. ♂ black, the femora, tibiæ, tarsi, except at apex, and the hypopygium, yellow. Head gray pollinose, the pile wholly yellowish-white, that of the vertex, bristles in upper part of the occiput and on the antennæ, black; third antennal joint as long as the first and only slightly wider, style one-fourth as long as the third joint. Pile of thorax mixed black and yellowish-white, the bristles black; pile of pleura white, that on the scutellum more yellowish, the four bristles black. Pile of abdomen yellowish-white, that of the venter white, of the femora mixed black and white, of the tibiæ and tarsi black; bristles of legs also black. Wings grayish-hyaline, the veins largely brown and indistinctly bordered with brown, stigma dark brown, fourth posterior cell closed and short petiolate.

♀ same as the ♂, with these exceptions: Pile of front largely black, its pollen yellow; in middle of front are two transverse shining black spots separated from the eyes by a pollinose interval nearly equalling the length of the second antennal joint. Posterior margin of each abdominal segment, except the first, yellow, including the greater portion of the last three segments; base of the third, fourth, fifth and sixth segments, and the whole of the following ones, shining; pile of the fourth and following segments both dorsally and ventrally erect and black.

Length, 9 to 13 mm. South Dakota (Aldrich), Montana (Morrison). One male and two females.

Thereva otiosa, n. sp. ♂ black, the knob of the halteres, and posterior margins of the second and third abdominal segments, white, tibiæ, except at apex, and base of tarsi, yellow. Head white pollinose; that on upper part of front narrowly black, on the vertex grayish-black; pile of entire head, except the black pile of the vertex, white; bristles of upper part of occiput and on the antennæ black. Third joint of antennæ five-sixths as long as the first and slightly narrower, style one-fourth as long as the third joint. Thorax grayish-black pollinose and marked with two narrow whitish pollinose vittæ, the lateral margin also whitish pollinose; pile of thorax mixed black and white or yellowish, the bristles

black ; pile of pleura and scutellum white, the four bristles of the latter black. Abdomen whitish pollinose, that at the base of the second, third and fourth segments blackish-gray ; pile of abdomen, venter and femora white, a few on the hypopygium black ; short pile of tibiæ and tarsi, like all the bristles of the legs, black. Wings, including the space between costa and auxiliary vein, grayish-hyaline, veins black, narrowly bordered with brown ; stigma dark brown, fourth posterior cell narrowly open, or closed and short petiolate.

♀ same as the ♂, with these exceptions : Front dark-brown pollinose on the upper part, and near the middle marked with two large rounded velvet-black spots contiguous to the eyes ; eighth and ninth abdominal segments shining, their pile largely black.

Length, 7 to 11 mm. Los Angeles County, California. Nine males and seven females, March to May.

Thereva novella, n. sp. ♂ same as *otiosa*, with these exceptions : Style of antennæ two-fifths as long as the third joint ; pile and bristles of vertex and bristles of occiput yellowish-white ; thorax destitute of black pile ; knob of halteres brown, margined with yellow ; veins of wings largely yellow, stigma also yellow and indistinct.

♀ differs from the ♀ of *otiosa*, besides in the particulars above mentioned, in that the front is destitute of the two round velvet-black spots, having instead a narrow, interrupted, dark-brown cross-band ; eighth abdominal segment opaque pollinose, its pile largely yellow.

Length, 8 to 11 mm. Los Angeles County, California. Five males and one female.

Thereva Johnsoni, n. sp. ♀ black, base of third antennal joint, tibiæ, and base of tarsi, reddish. Head yellowish-gray pollinose, front with two transversely oval shining-black spots on its middle ; pile of head pale yellow, that of the front mixed with black, bristles of occiput and of the antennæ black. First joint of antennæ slender, scarcely wider than the second, third joint lanceolate, one and a half times as wide as the second, three-fourths as long as the first joint ; style one-fifth as long as the third joint. Thorax yellowish pollinose, marked with two light gray vittæ, the sides a purer gray ; pile of thorax and scutellum pale yellow, less than half as long as the black bristles, a few black pile on the thorax ; pleura gray pollinose and yellowish-white pilose. Knob of halteres brown. Abdominal segments one to six uniformly yellowish-gray pollinose and short yellow pilose, the seventh and following segments shin-

ing brown ; pile of abdomen erect and largely black. Front and middle femora destitute of bristles. Wings yellowish gray, a hyaline streak in base of marginal cell, a darker gray cloud in apex of first submarginal and along front edge of the second submarginal cell ; stigma and a small spot at base of the second submarginal and of each posterior cell, dark brown ; fourth posterior cell closed and short petiolate.

Length, 10 mm. Washington. Received from C. W. Johnson, and collected by Prof. O. B. Johnson, after whom the species is named.

SOME NOTES ON MICHIGAN INSECTS, PRINCIPALLY COLEOPTERA, AFFECTING FOREST TREES.

BY C. H. TYLER TOWNSEND.

The following notes were presented to the Entomological Society of Washington, May 1, 1890, under the title of "Some insects affecting certain forest trees." They are herewith somewhat revised and sifted for publication, since the matter which follows is of some value.

The paper furnishes a record of certain insects mostly coleopterous, which I found many years ago in Michigan affecting either the trunks or foliage of forest tress and shrubs and which I have since been able to identify in connection with my notes. All are southern Michigan records, and belong to the vicinity of Constantine. Many coleoptera found under dead bark, but which feed merely on decaying vegetable tissue, have been omitted. Such are Prionochæta, Scaphidium, Ditoma, Bactridium, Melanotus, Cis, Tenebrioides, Melandrya, Uloma, Platydema, Penthe, Cratoparis, and many others.

Coleoptera.

Brontes dubius, F.—Under bark of linden (fall) ; elm and butternut logs (May).

Paromalus æqualis, Say.—Under bark of decaying butternut and linden logs (May).

Hister lecontei, Mars.—In burrows under decaying bark of butternut, elm, and linden.

Adelocera aurorata, Lec.—One under bark of old oak log (Jan.)

Alaus oculatus, L.—Boring stumps and dead trunks of oak, hickory, poplar and linden.

Cardiophorus gagates, Er.—On oak leaves (May).

Elater manipularis, Cand.—Under decaying linden bark (Nov.)

Elater nigricollis, Hbst.—In hickory stump (Oct.); and poplar stump (Dec.)

Elater linteus, Say.—In decaying poplar stump (fall).

Elater apicatus, Say.—In decaying poplar stump (Dec)

Agriotes oblongicollis, Melsh.—On leaves of hazel (May); and beech (May, June).

Limonius auripilis, Say.—On beech foliage (May, June).

Limonius basillaris, Say.—On new oak and beech growth (May, June).

Acmæodera culta, Web.—On cut oak wood (July).

Agrilus ruficollis, F., *otiosus*, Say, *bilineatus*, Web.—On cut oak wood and rails (July).

Brachys ovata, Web.—On foliage of beech and oak (May to July).

Brachys aerosa, Melsh.—Eating oak and hazel leaves (May); leaves of beech, elm, ironwood (*Carpinus*), (May, June).

Brachys aeruginosa, Gory.—On leaves of beech, elm, ironwood (*Carpinus*), (May, June).

Thanasimus dubius, F.—In numbers on piles of oak wood (May). In coitu (May 20).

Thaneroclerus sanguineus, Say.—Under bark oak stumps (Oct.); under bark butternut log (May).

Dichelonycha elongata, Fab.—On leaves of oak (May).

Lachnosterna prunina, Lec.—On foliage of red oak (May, June).

Lachnosterna crenulata, Fröh.—On foliage of red oak (May).

Lachnosterna tristis, F.—Swarming in red oaks (May).

Anomala undulata, Melsh.—Swarming in red oaks (May).

Strigoderma arboricola, F.—On red oaks (May). The last five species occur mostly in the evening.

Cotalpa lanigera, L.—Eating leaves of dwarf willows (*Salix cordata*), (May, June).

Parandra brunnea, F.—Under bark of linden and butternut logs.

Smodicum cucujiforme, Say.—Many specimens found on a white oak fence post, beside small holes in post from which they had emerged (June, July).

Dorcaschema nigrum, Say.—On hickory foliage (May, June).

Goes pulverulenta, Hald.—Dead beetle found in a cell in cut hickory.

Liopus alpha, Say.—On oak rails, and on fence posts under red oak tree (June).

Lepturges querci, Fitch.—On oak posts of fence under red oak tree (June).

Hyperplatys maculatus, Hald.—Same as preceding.

Saperda vestita, Say.—In sapwood, also in bark of dead linden trunk in all stages (May).

Saperda tridentata, Oliv.—Beetles and pupæ under bark of elm logs (May).

Donacia flavipes, Kby.—Twenty-seven taken on leaves of new oak growth (May 23).

Chlamys plicata, F.—On witch hazel (June).

Exema gibber, Oliv.—On witch hazel (June).

Cryptocephalus venustus, F.—On oak and hickory foliage.

Pachybrachys othonus, Say, *carbonarius*, Hald., *infaustus*, Hald.—On oak foliage.

Noda (Colaspis ?) convexa, Say.—On beech foliage.

Chrysomela scalaris, Lec.—On leaves of low sumac, hazel, linden.

Chrysomela multipunctata, Say. var. *bigsbyana*, Kby.—On leaves of low sumac *(Rhus)*.

Lina lapponica, L.—In numbers eating leaves of dwarf willow *(S. cordata)*, (May, June).

Blepharida rhois, Forst.—On low sumac.

Haltica inærata, Lec.—On foliage of ironwood *(Carpinus)*, beech and elm (May, June).

Odontota rubra, Web.—On beech, elm and oak foliage (May, June).

Diaperis hydni, F.—Twenty-five or thirty taken, Feb. 16, in groups in small passages in the inner wood of an old oak stump. Also found in same places later in the spring. When disturbed, they emit a yellowish

fluid which stains the skin, has a pungent odour, and turns alcohol to a crimson colour. The heads and legs of some worker termites dropped in the same alcohol became of a deep violet colour, but the heads of soldier termites, from their harder integument, remained unstained. These beetles exhibited considerable variation in the disposition of the black markings on their orange-red elytra. I could find no communication with their galleries from the outside. Their social hibernation is interesting.

Synchroa punctata, Newm.—Beetles and pupæ under bark of linden and elm logs (May).

Attelabus analis, Illig., *bipustulatus*, F., *rhois*, Boh.—On leaves of young hickory.

Magdalis armicollis, Say.—On elm foliage (June).

Anthonomus cratægi, Wlsh.—On beech foliage.

Mononychus vulpeculus, F.—On witch hazel (June).

Cœliodes acephalus, Say.—On witch hazel (June).

Balaninus nasicus, Say, *rectus*, Say.—Very numerous under an isolated red oak (Sept. 15 to 22 only).

Eupsalis minuta, Drury.—In dead oak and linden.

Cossonus platalea, Say.—Fifty-four taken under bark of an old butternut log (May).

Determinations of above coleoptera were made by Dr. Horn and Mr. Schwarz.

Lepidoptera.—A sesiid (*Sannina*, sp.?) was bred from large knotty galls common on trunks of red oaks. These are rough excrescences of the bark and wood, frequently attaining a diameter of several feet. The moths are about the size of *S. acerni*.

Diptera.—The pine-cone gall of *Cecid. s.-strobiloides*, O. S., occurs commonly on *Salix cordata* (June, July). It remains conspicuous through the winter, when these shrubs are otherwise bare.

THE PHALANGINÆ OF THE UNITED STATES.

BY NATHAN BANKS, SEA CLIFF, N. Y.

The family Phalangidæ is readily separable from the other families of Phalangida by having but one simple (not compound) claw at the end of each tarsus and having a claw at the end of palpus. The last (fifth) joint of palpus is nearly always longer than the next to last; an exception is the male of Protolophus. Our species have been described by Say (Complete Writings), Wood (Bull. Essex Inst., 1868), Weed (Bull. Ill. State Lab. Nat. Hist., 1889, and various articles in Am. Nat., 1887–1893), and Banks (Trans. Ent. Soc., Wash., 1891). The genera known to me may be separated by the following key :—

1. Body with two rows of large tubercles, male with fifth palpal joint shorter than fourth, female with third palpal joint forked..... *Protolophus.*
   Body without large tubercles, fifth palpal joint always longer than the fourth.. 2
2. A group of spines on the front margin of the cephalothorax, eye-tubercle with two rows of prominent spines..... 7
   Not with both of above characters..... 3
3. Three large spines on the second joint of palpus, eyes exceedingly large..... *Caddo.*
   Without such spines, eyes normal 4
4. Femur I., much shorter than body, in the females not as long as width of body..... 5
   Femur I., longer, or in some females but little shorter than body..... *Liobunum.*
5. Metatarsus I., without false articulations, femora and tibiæ I. and III. much thickened..... 6
   At least one false articulation in metatarsus I., femora and tibiæ normal..... *Leptobunus.*
6. Eye tubercle spinose..... *Globipes.*
   Eye tubercle smooth..... *Eurybunus.*
7. Second joint of palpus with prominent spines..... 8
   Second joint of palpus without prominent spines..... 9
8. No false articulation in metatarsus I., eye tubercle more remote from the anterior margin. ..... *Lacinius.*
   At least one false articulation in metatarsus I., eye tubercle farther forward..... *Oligolophus.*
9. Femora as narrow as, or narrower than eye-tubercle, fifth joint of palpus longer than the third and fourth together..... 10
   Femora wider than eye-tubercle, fifth joint of palpus not longer than the third and fourth together..... *Homolophus*

10 { Femur I. longer than width of body.....*Phalangium*
{ Femur I. not longer than width of body.....*Mitopus*

Trachyrhinus, Weed [Am. Nat., 1892], is unknown to me; it appears to be near Homolophus, but with more slender legs, more spinose palpi, with a different patella, and larger eye-tubercle. Wood's description of *P. favosum*, however, reads much like *Mitopus biceps*, Thorell.

These genera I arrange in four tribes.

PROTOLOPHINI.

This embraces the single genus Protolophus, remarkable for the structure of the male palpi.

Protolophus, gen. nov.

In the male the second, third and fourth palpal joints are greatly enlarged, and the fifth joint is a little shorter than the fourth; the claw at the end of the fifth is, however, distinct. The female has the palpi more normal, the fifth joint longer than the fourth, the third joint is prolonged on the inner side, as in Prosalpia, and the fourth has a small projection at tip on the inner side. The eye-tubercle is low, with two rows of small spines. The legs are short, femur II. being shorter than the body; tibiæ without false articulations. The dorsal parts of the first five abdominal segments are more united than those beyond, each of these five segments having a median pair of large tubercles. Two species are known to me.

Abdominal tubercles unarmed.....*tuberculatus.*
Abdominal tubercles with a few apical spines.....*singularis.*

Protolophus tuberculatus, n. sp.

Length, 8 mm.; femur I., 2.3 mm.

Colour—Gray to brownish, the cephalothorax gray, the dorsum of abdomen darker, somewhat reddish-brown. Body with a broad, darker, median stripe, beginning at the anterior margin of the cephalothorax and extending to the sixth abdominal segment, narrower and darker on the abdomen than on the cephalothorax. Just below the front margin of the cephalothorax are two small median spines. The venter is pale grayish with a few brown spots near the sutures, the tips of the mandibles black, the coxæ brownish, the trochanters yellowish, the femora, patellæ and tibiæ reddish-brown, the metatarsi yellowish, the tarsi gradually becoming darker, the abdominal tubercles black. The legs are covered with small spines, on each side of the coxæ there are rows of small black plates.

The female is similar, but the dorsum is more reddish, the venter more

mottled than in the male, and there are some brown spots on the basal joint of the mandibles above.

Southern California. Not uncommon.

Protolophus singularis, n. sp.

Similar to *tuberculatus*, but the abdominal tubercles bear from two to four spines. The anterior margin of the cephalothorax is more spinose ; and the second and fourth joints of the palpi are much more enlarged than in that species ; the eye-tubercle is also more spinose. The legs are more slender, especially the second pair. The body and legs are more brownish, and the palpi are mottled, the second joint of the mandibles very dark.

Southern California. Collection of Dr. Geo. Marx. One male.

CADDINI.

This tribe embraces only *Caddo agilis*, remarkable for its large eyes. It shows its relation to certain genera of the next tribe in having spines on the second palpal joint. One young specimen has a white band above. I have it from N. Y. and D. C.

OLIGOLOPHINI.

The very spinose character of the members of this tribe distinguish them from all their allies.

Oligolophus pictus, Wood.

This occurs in the Eastern States.

Lacinius ohioensis, Weed.

Ohio, N. Y.

Lacinius texanus, Banks. Psyche, 1893.

Texas.

Mitopus biceps, Thorell.

Described by Thorell in 1876 from Colorado ; I have received specimens from L. M. Cockerell.

Phalangium cinereum, Wood.

The northeastern parts of the United States and in Canada. [A. D. MacGillivray].

Phalangium longipalpis, Weed.

Arkansas. This would be called Cerastoma by some European authorities.

HOMOLOPHUS, gen. nov.

Quite prominent spines upon the cephalothorax and eye-tubercle, and with transverse rows on the abdomen. Legs thicker than usual, the anterior femora being much thicker than the eye-tubercle is wide, almost as thick as the basal joint of the mandibles; femur I., is a little longer than the width of the body, tibiæ without false articulations. The fifth joint of palpus is not quite as long as the third and fourth together. This genus is related to Phalangium, but the last joint of palpus is shorter, and the legs are shorter and stouter.

Homolophus arcticus, n. sp.

Length, 6.4 mm.; femur I., 4.2 mm.

Colour—Cephalothorax yellow-brown, black in the middle behind; dorsum of abdomen black; legs dark red-brown, yellow at extreme base of the femora and on the trochanters; venter brown. Eye-tubercle with two rows of a few spines; cephalothorax with scattered spines, arranged much as in *Phalangium cinereum;* abdomen with six transverse rows of similar spines; posterior angles of the cephalothorax projecting and rounded with a few prominent spines. Legs stout, very spiny, having a few more prominent spines at tips of femora, patellæ and tibiæ; second pair of legs lost.

Commander Island, Siberia. Collection of Dr. Geo. Marx.

LIOBUNINI.

This tribe includes the more typical and common members of the sub-family.

GLOBIPES, gen. nov.

The principal character of this genus is the enlarged femora and tibiæ of legs I. and III., the eye-tubercle is low and with a few spines, legs short, but femur II. is longer than the body and more than twice as long as femur I. Metatarsus I. without false articulations. The palpi are normal.

Globipes spinulatus, n. sp.

Length, 3.5 mm.; femur I., 1 mm.

Colour, brown or reddish-brown, tip of abdomen more gray, dorsum somewhat mottled with brown, coxæ yellowish, trochanters and base of femora yellowish, remainder of femora, patellæ and tibiæ reddish, metatarsi yellowish, tarsi a little darker, palpi pale, tips of mandibles black. The female has two median white spots near the tip of the abdomen. The

palpi are very short, the patella and tibia somewhat enlarged, the fifth joint longer than the third and fourth together. The cephalothorax and abdomen are smooth; the legs have many small spines, most prominent on the enlarged parts of legs I. and III.; tibia II. has three false articulations. The legs of the female are longer and more slender than those of the male. The abdomen of the female is larger and pointed behind, while that of the male is somewhat truncate.

Southern California.

EURYBUNUS, gen. nov.

Eye-tubercle very low and smooth, cephalothorax with an elevation on the anterior margin bearing a few small spines. The segments of the dorsal shield of the abdomen are so closely united that their sutures are hardly discernible. The femora, patellæ and tibiæ of legs I. and III. are enlarged; femur II. barely twice as long as femur I., and a little longer than the body; metatarsus I. without false articulations.

Eurybunus brunneus, n. sp.

Length, 9 mm.; femur I., 4 mm.

Colour—Dorsum uniform brown, the margins of the abdomen a little white; venter grayish-white; coxæ, trochanters and part of the femora yellowish, a band near tip of femur brown, the extreme tip whitish; base of patella brown, the tip white; middle of tibia brown, the base and tip white; same with the metatarsus, except that the brown is not as dark; tarsi brownish; palpi and mandibles yellowish. Body very smooth, femora I. and III. with a few short scattered spines, similar spines on the under side of tibiæ and metatarsi I. and III., tibia with three false articulations.

Southern California.

LEPTOBUNUS, gen. nov.

Legs short, joints but little thickened, femur I. much shorter than the body; femur II. frequently not as long as the body. Eye-tubercle narrow, usually smooth. *L. californicus* is the type. In this species the palpal claw is smooth, and metatarsus I. has but one false articulation; lateral pore is very large and looks outward. In the two other species the palpal claw is dentate, metatarsus I. has several false articulations, and the lateral pore is like that of Liobunum. For these reasons the last two species may form another genus.

1 { Metatarsus I., with one false articulation ..... *californicus*
  { Metatarsi I., with several false articulations 2

2 { Dorsum smooth ..... *maculosum*
  { Dorsum granulate ..... *grande*

Leptobunus grande, Say.

Liobunum similis, Weed.

Va., D. C., Ohio, Ill.

Leptobunus maculosum, Wood.

Pa., W. Va., Ohio.

Leptobunus californicus, n. sp.

Length, 6.6 mm.; femur I., 2.7 mm.

Colour—white above, mottled with brown and black, the vase mark indefinite; beneath whitish, with a few brown spots; legs yellowish, with an apical brown ring on each joint. Eye-tubercle low and smooth; body smooth; legs smooth, except the tarsi, which have spines at each articulation. Legs quite stout; metatarsus I. with one and tibia II. with two false articulations; palpi with the fourth joint longer than the third; fifth joint about equal to the third and fourth together.

Southern California (Davidson).

LIOBUNUM, Koch.

Forbesium, Weed.

The genus Forbesium is based on young forms of previously described species. Liobunum is very rich in species; many forms remain to be described. I will mention but one, readily recognized by having two large yellow spots.

Liobunum bimaculatum, n. sp.

Length, 4.2 mm.; width of abdomen, 3.5 mm.; femur I., 11.9 mm.; femur II., 19.5 mm.

Colour—dark brown, with two large yellow spots over the juncture of the cephalothorax and abdomen; the eye-tubercle black; venter, palpi and legs yellowish; patellæ and tibiæ at tip brownish; metatarsi and tarsi somewhat brownish. Body short and broad; the end of abdomen bent under; the side-pieces of the sternum appear to be completely separated from the sternum proper; coxæ, venter and sternum with a few granules. Eye-tubercle moderately high; more than its length from the anterior margin, and with two rows of spines above. Abdomen with a few transverse rows of small, stiff hairs. Legs extremely long, with some small spines

and a few larger ones at the tips of the femora and patellæ; tibia I. without false articulations, tibia II. with several. Second joint of palpus with small spines beneath, the third and fourth joints about equal.

Southern California. Kindly loaned to me for description by Dr. Geo. Marx.

The remaining species of this genus are as follows:—*L. vittatum*, Say, *L. dorsatum*, Say, *L. nigropalpi*, Wood, *L. exilipes*, Wood, *L. verrucosum*, Wood, *L. ventricosum*, Wood, *L. calcar*, Wood, *L. bicolor*, Wood, *L. politum*, Weed, *L. elegans*, Weed, *L. longipes*, Weed, *L. nigripes*, Weed. All are from the eastern United States except *L. exilipes*, from California; this also occurs near Olympia, Wash. State (Trevor Kincaid).

CORRESPONDENCE.

UNIDENTIFIED BOMBYCIDS.

Sir,—In regard to Mr. Smith's note on page 164 in CANADIAN ENTOMOLOGIST for June, I would say that I am the authority for the reference of *Saligena personata* to *Raphia frater*, and for the fact that now a series of specimens of *Sphida obliquata* are in Brit. Mus. Coll. under the label of "Edema obliqua." I have not the Brit. Mus. lists before me, but this series of apparently bred specimens of *Sphida obliquata*, which I found on my second, were not in Brit. Mus. Coll. at my first visit, when I examined the collection, with a specimen of the moth, for the express purpose of identifying the species. They could not have escaped my notice. They must have been added subsequently to my visit and description. On this first occasion I discovered, quite misplaced, the type of the much more obscure species *Arzama densa*, Walk.; without this identification the name *Arzama* would have hardly been placed in our catalogues. I recognized *Sphida obliquata* as allied to the type of *Arzama densa* at a glance. I examined the *Notodontidæ* carefully, making several identifications, and the specimens now under *Edema obliqua* were not then there. A reference to our original paper in Tr. Am. Ent. Soc. Phil., will show that I examined the Notodontians carefully. The probability is, that the species must remain as catalogued by me, viz.: *Sphida obliquata*, G. & R., when the facts are all known. In cases where specimens are simply stuck without type labels under printed labels in Brit. Mus. Coll., they are not to be taken as Walker's type, when in any way disagreeing with Walker's descriptions. A. R. GROTE, Bremen.

A BLACK MALE OF PAPILIO TURNUS.

Sir,—Having been a constant reader of the ENTOMOLOGIST for the past ten or twelve years, I have never found anything published in your valuable journal as regards the capture of a black male of *Papilio Turnus*. In the annual report of the Entomological Society of Ontario, for 1889, on page 38, Mr. Fletcher writes at some length in regard to the Tiger Swallow-Tail butterfly *(Papilio turnus)*. The statement to which I wish to call your attention is on page 39, on the eleventh line from top of page, where he says: "*No specimen of the black male has ever been taken; the only approach to this melanic form is a beautiful suffused variety.*" No doubt but the author was about right, for I had examined other journals and had failed to find any account bearing upon this subject, as I had one or two beautiful Papilios in my collection, and was uncertain as to what they were. The other day I was out collecting, and to my great surprise captured a beautiful ♂ and ♀ of *Turnus* in copulation, so you see there is no question as to their identity. This beautiful black male *Turnus* resembles *Papilio Troilus* in some respects, having its wings black; primaries with a marginal row of rich cream-coloured spots, whereas in *Troilus* they are a light or pale yellow; secondaries with bluish lunules, while in *Troilus* they are green, running along the margin. The anal spot with a bluish crescent as in *P. Palamedes* and in *P. Cresphontes*, while the anal spot in *Troilus* is entirely orange. Tails slender and black. After being a collector of insects for the past twenty years, both in the south and north, this was indeed the first golden opportunity and I had the pleasure of the capture of a black male *Turnus*. Its distribution covers a wide area, reaching from the far north to the confines of the tropics, going by the variety name *Glaucus* in the south, just in the same manner as Papilio Machaon of the old world, which is to be found in England, France, Germany, Northern India and Japan, and a huge variety *Hippocrates*, of Northeast China, while *P. Polydorus* and *P. Alexanor*, strictly of European origin, are limited to a much smaller territory than either *Turnus* or *Machaon*. Whilst *P. Rutulus* and its varieties *Arizonensis* and *Ammoni*, resembling in general appearance *Turnus*, but somewhat smaller, and being distinguished by its having the yellow band which runs along the posterior margin on underside of primaries unbroken, while in *Turnus* it is disconnected, is found throughout the Pacific states, P. Eurymedon, its var. *Albanus*, *P. Daunus* and *P. Pilumnus*, all of which belong to the yellow tribe of Papilios, range within the confines of the western states, while *P. Œbalus*, which bears a close resemblance to *Turnus* except that the yellow shows a slight tinge of orange, is found in Mexico, and thus far, has never been found elsewhere even as a winged visitor. More fully will these matters be treated of in my forthcoming work on "The Geographical Distribution of Butterflies and Moths."

A. S. VAN WINKLE, Keota, Iowa.

Mailed August 2nd.

N.Y. ACADEMY OF SCIENCES. LIBRARY

The Canadian Entomologist.

VOL. XXV. LONDON, SEPTEMBER, 1893. No. 9.

DESCRIPTION OF A PECULIAR NEW LIPARID GENUS FROM MAINE.

BY B. NEUMOEGEN, NEW YORK.

DYARIA, *nov. gen.*

Head prominent, with a high vertical tuft. Front nearly square, rather higher than broad; slightly convex. Vertex small, with a low, conical central projection. Ocelli absent. Eyes large, naked, reaching as far as the front and above the vertex. Antennæ inserted far apart, close to the margin of the eyes. In ♂ lengthily bipectinate, the pectinations diminishing gradually, the distal third being bare. To judge from the fragments of a ♀ specimen with broken off antennæ (only 6 joints left to judge from), the ♀ antennæ are apparently simple. Palpi exceeding front by two-thirds their length; second joint very large, third small. Tongue weak, but moderately long, coiled. Thorax robust, about as broad as long.

DYARIA SINGULARIS, Neum. ♂.
(Enlarged about double its size.)

Primaries well drawn out, about twice as long as broad. Costa straight, apices pointed and exterior margins well rounded. Vein 1 free and straight, furcate at base. Median four branched. Vein 2 arising very much beyond middle of cell; 4 and 5 approximate at their origin, at lower angle of cell. Cell closed, rather narrow and near to the costal edge. Cross vein bent inwardly at centre. A long, very narrow accessory cell, reaching from the apex of discal cell more than half way to apex of wing, its sides in apposition except at the two extremities, so that it is closed for the greater part of its length. Vein 6 from the under side of accessory cell, near its origin; 7 and 10 from the end of accessory cell, on each side of a stalk, which becomes furcate very close to the apex of wing, thus forming veins 8 and 9. Vein 11 from the subcostal beyond the middle of the discal cell. Vein 12 free from base.

Venation of wings and legs of DYARIA SINGULARIS, Neum, ♀.
(Greatly Enlarged.)

A furcate, false discal vein in discal cell, and a distinct submedian fold.

Secondaries about as broad as long; exterior margins well rounded, bluntly pointed at angle. Anal margins straight. Two internal veins. Median four branched, as in primaries. Vein 3 arising near lower angle of cell; 4 and 5 close together from the lower angle of cell, which is pointedly drawn out. Cell closed. Cross vein angulated, its lower, longer limb obliquely drawn out; its upper approximately at right angles to the subcostal. Veins 6 and 7 from the upper angle of the cell, 7 united to 8 at a point about one-fifth of its length from origin, then free to exterior margin. Vein 8 free from base, except at its junction with 7, nearly straight, but slightly bent at the junction, not sinuate. Traces of a discal vein.

Frenulum present; in ♀ a long double spine; in ♂ a long spine fastened into a loop on the subcostal vein of primaries.

Abdomen long and slender, exceeding secondaries by about one-fourth, thickest centrally, gently tapering; slightly tufted. Legs long and slender; the middle pair the longest, the others subequal. Anterior tibiæ unarmed, short, not longer than the first tarsal joint, with an epiphysis less than its own length, projecting with conical tip. Tarsi feebly spinulated, with terminal claws. Middle tibiæ with a pair of long, sharp apical spurs. Hind tibiæ slightly enlarged centrally, quite long and thick, with submedian and apical pair of long spurs.

Dedicated to my faithful co-labourer and friend Mr. H. G. Dyar.

This is a very queer genus; although not a typical Liparid, I do not see any other way but to place it among the Liparidæ of our fauna.

DYARIA SINGULARIS, *nov. spec.*

Eyes black. Head, as well as hairy tuft on latter, yellowish-gray. Vertex between the stems of antennæ blackish. Thorax yellowish-gray interspersed with black hair.

Wings thickly scaled, whitish-gray with the following maculations in black or light brown :—

Primaries : Three transverse lines in black. The t. a. line curving outwardly at centre. The basal space enclosed by it, densely scaled with blackish-brown hair from costa to interior margin. The t. p. line undulating, dented inwardly between median vein and interior margin. The cellular, as well as median space enclosed by the t. a. and t. p. lines, is whitish, densely dotted with black granules. A prominent black discal spot, tufted with yellowish hair. A subterminal line of black dots ; space between the latter and the t. p line of light brown. Subterminal space gray, with blackish shades along veins, and a terminal line of black dots at intersection of veins. Yellowish-brown fringes.

Secondaries : An undulating mesial line, and a subterminal line of subtriangular dots, both of blackish colour. Mesian space light brown, subterminal space gray with black granules. A blackish terminal line, and a heavy tuft, along anal margin, of yellowish-gray. Fringes of the same colour. The basal space whitish with black grains. In the centre a distinct black discal spot, heavily tufted. Abdomen yellowish-gray, with black segmentary lines and white dorsal hair along latter.

Below, both wings of lustrous yellowish-gray, showing blackish tints in apical part of submedian space of primaries, as well as faint traces of the t. p. line. Very faint indications of transverse lines on secondaries. Lower part of thorax blackish. Legs yellowish-gray. Fore tibiæ and tarsi blackish, the latter dotted with yellowish at sections.

Expanse of wings, 26 mm.

Length of body, 8 mm.

Habitat : Bangor, Maine.

Type : ♂, coll. B. Neumoegen.

Caught at electric light by Prof. Carl Braun, who also sent me the fragments of a ♀ just good enough to make out the venation and to lead me to the belief that the ♀ antennæ are probably simple.

This is one of the most singular little Bombycids of our fauna, easily distinguished by its heavy scales and the hairy tufts on collar and discal dots. It resembles West Indian genera, as Prof. Smith rightly remarked to me, but Prof. Braun assured me of its Maine origin.

THE SPECIES OF EUCOPTOCNEMIS.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In 1874 I proposed the generic term *Eucoptocnemis* for the *Heliophobus fimbriaris* of Guenée, Noct. I., 172, whose statement that the species had two terminal spines on the anterior tibiæ rendered its reference to the genus *Heliophobus* of Boisduval improbable. In reality our species appears not congeneric with the European *Heliophobus hispidus*. At the time of proposing the genus I had no material. Later on I examined two or three specimens taken near the coast of Massachusetts, but they were so worn that I could not satisfactorily identify the species, while they probably belonged to Guenée's *fimbriaris*. In a considerable collection from New York, which I have identified for the Bremen Museum, I find, however, quite a number of specimens which I determine as Guenée's *fimbriaris*; the material is generally well preserved, most of the insects are quite or sufficiently perfect, and both sexes are represented. An examination gives us the following structural characters:—The abbreviated anterior tibiæ show two longer terminal spines and a row of shorter spinules on each side. Besides the pair of calcaria, the inner spur of which is shortest, the middle tibiæ are also provided with spinules; the hind tibiæ, with two pair of spurs, are also armed. The testaceous legs are sparsely clothed with pale hair (allowing the armature to be easily studied), and in this respect showing affinity to our Western *Cladocera niveivenosa*, Grt. The antennæ are long, in the male finely bipectinate, the pectinations gradually decreasing to the tips, in the female simple. The front is smooth, without tubercle. The palpi are somewhat divaricate, with short terminal article. The thorax is short and square, somewhat densely clothed with hair-like scales, pilose. The abdomen is comparatively short, not exceeding the secondaries, untufted, thinly scaled and rather weak. Wings broad, with the fringes long and even, unicolorous. Eyes naked, adorned with a variable pattern of black markings, unlashed.

EUCOPTOCNEMIS FIMBRIARIS, Guen., V., 172 *(Heliophobus)*.

Grt. Bull. B. S. N. S. I., (13), 1874.

9 ♂ s, 4 ♀ s. Forewings broad, triangulate, silky, of a more or less determinate grayish-red, in some specimens the red is quite clear, somewhat brickish in tint; this is the case in all the females examined. Maculation subobsolete. Orbicular reduced to a dark or blackish spot, which in one or two individuals shows a few central pale scales. Reni-

form upright, elongate, narrow, slightly constricted medially, yellowish, followed by a blackish arc and a more or less obvious blackish shading. Under the glass, the black scales are seen to extend along the folds and veins between the reniform and the t. p. line, while the surface of the wing, generally, is seen to be sparsely peppered with black scales. The reniform is also preceded by a curving black outline and the yellowish colour spreads a little above and below, so that Guenée's comparison of its total shape to an elongated letter x becomes intelligible, though by no means obvious. These black markings tend to be lost in the rubbed examples. The lines are seldom continuous and tend to become dotted or wholly lost, or are merely marked on costa. The t. p. line consists apparently of pale venular spots preceded by black dots. The t. a. line is in some specimens indicated, indented above and below, medially rounding outwardly. In one specimen the base of the wing shows a slight gathering or patch of black scales. Noticeably in the female specimens, which are perhaps fresher, the median lines appear as faint continuous black shades. The subterminal line is indicated by the slight difference in shade between the paler terminal and darker subterminal fields, the latter of which is marked on costa by a darker shading. A more or less obvious terminal line, sometimes well marked by interspaceal disconnected lunular marks. Hind wings variable in colour, usually quite pale with faint diffuse terminal shading, silky, in one male quite dark; terminal line variable, occasionally absent. Palpi blackish outwardly, and behind the eye usually some blackish scales. Thorax like forewings; front and collar somewhat paler. Abdomen quite pale or whitish. Beneath, the forewings are darker, the hind wings pale, the colours even, all markings lost. The male specimens vary in expanse from 28 to 36 mil.; Guenée gives 35 mil. The females average 33 mil., as near as may be.

Var. Sordida.

5 ♂s, 4 ♀s. The colour is entirely sordid grey, without trace of red. Under the glass I have, however, detected about costa a faint reddish tinge in some of the paler specimens. The yellow tinge of the reniform is less obvious. The lines are generally more distinct and continuous, and even the median shade line is often evident running near the reniform, which latter seems to indicate in this species the closure of the median cell, and is always the most prominent mark of *fimbriaris*. In one specimen of *sordida*, the basal patch is marked. There can be no doubt that this is

an extraordinary and easily recognizable colour variety of *fimbriaris*, although at first sight it might be taken for a distinct species. From the present collection it would seem to be as common as the typical reddish form. Types in Mus. Brem.

Eucoptocnemis fimbriaris would seem to be a local insect, since I have, with the one exception above noted, never before met with it in any collection submitted to me, nor have I ever collected it myself. It would seem to be not only quite variable, but its scanty markings are also easily removed by attrition, when it presents a vague and pale appearance, only the reniform being indicated. The insect is best known by its bipectinate male antennæ, its pilose thorax and weak body parts, the armature of its thinly clothed legs, the well-developed fringes, silky and comparatively wide wings. Superficially it rather resembles some of the red species of *Agrotis*. It is probable that the median lines, if fully developed, would be double, with pale included shade, judging from those specimens in which they are marked on costa. They would then correspond with the yellowish reniform, which appears as a broad abbreviated line or bar, edged with black. But, in the specimens before me, the lines are usually obliterate and, even in one fresh male, their location can be barely made out, though with the help of the microscope. I trust before long some locality will be found for this interesting noctuid, and its history be fully made out.

NORTH AMERICAN THYSANURA.—III.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Synopsis Family JAPYGIDÆ.

The family *Japygidæ* has representatives in almost all parts of the world. Nearly a dozen species have been described, the majority of which are from Europe. The species are local and rare, and not usually found north or south of about 40° of latitude. Only a single genus is known—*Japyx*.

JAPYGIDÆ.

Antennæ multiarticulate; prothorax minute; tarsi biunguiculate; claws equal; abdomen with ten segments; segments one to seven with bristle-like rudimentary abdominal appendages; caudal appendages unsegmented, horny, pincer-like.

The characters of the single genus are the same with those of the family.

The species can be easily separated by means of the following key :—

A.—Right arm of the forceps with a single large tooth.

B.—Antennæ with forty-five to forty-eight segments.....
.....*Saussurii*, Humbert.

BB.—Antennæ with about thirty segments.....*subterraneus*, Pack.

AA.—Right arm of the forceps with two large teeth; antennæ with twenty-four segments.....*americana*, MacG.

Japyx Saussurii, Humbert.

Head quadrangular, not broader than long; antennæ 45–48-jointed, segments cylindrical; prothorax very little more than half as broad as the head, truncate in front; abdomen broader behind, segments immaculate, segments one to four rounded on the sides behind, fifth and sixth with their hind angles obtuse, the seventh slightly broader than sixth, much broader and overtopping the eighth, emarginate behind, the posterior angles produced in long, slender spines, lateral margins broadly rounded, seventh and eighth subequal in length, the eighth broadly, deeply, acutely emarginate before, the posterior angles not produced, the sides straight, ninth one-third the length of the eighth, posterior angles not produced, tenth slightly shorter than the forceps, the tenth and forceps together slightly longer than the four preceding segments; right arm of the forceps slightly broader than the left, inner margin concave, a large tubercle at middle, two smaller rounded tubercles before the larger tubercle, equidistant from the larger tubercle and from each other; beyond the larger tubercle the inner margin is slightly convex, with smaller tubercles, which become smaller and smaller, from the large tubercle for two-thirds the remaining length of the arm, the remaining third smooth; the left arm is broadest at base, with a large tubercle just before the middle, a smaller tubercle midway between the base and the large tubercle, beyond the large tubercle for a short distance there are small rounded tubercles, beyond which the inner margin is crenulate, the apical half beyond the large tubercle is smooth; the antennæ, underside of the legs, body and forceps covered with stiff yellow bristles; segments 1–7 with rudimentary appendages, the apical bristle long, stout, apical half brown.

Length, 20 mm.; length of the antennæ, 8 mm.; length of the abdomen, 13 mm.; length of the last abdominal segment and forceps, 5 mm.

Habitat—Orizaba, Mexico (Lawrence Bruner).

BIBLIOGRAPHY.

Japyx, Haliday.

1864.—Haliday, Trans. Linn. Soc. Lond., XXIV., 442; pl., XLIV.

1873.—Lubbock, Monog. Collem. Thysan., 215.
1887.—Karsch, Berl. Ent. Zeit., XXXI., 154.

Saussurii, Humbert.
1868.—*Japyx*, Humbert, Rev., et Mag. Zool., 351; pl., XXII., 1–5.
1886.—*Japyx*, Packard, Amer. Nat., XX., 382.
1891.—*Japyx*, MacGillivray, CAN. ENT., XXIII., 269.

subterraneus, Pack.
1874.—*Japyx*, Amer. Nat., VIII., 501.
1891.—*Japyx*, MacGillivray, CAN. ENT., XXIII., 269.
1893.—*Japyx*, MacGillivray, CAN. ENT., XXV., 173.

americana, MacG.
1893.—*Japyx*, MacGillivray, CAN. ENT., XXV., 174.

A NEW SPECIES OF HYPOPTA.

BY HARRISON G. DYAR, NEW YORK.

An interesting species of Hypopta has been sent to me by Mr. T. D. A. Cockerell, from Las Cruces, New Mexico. It appears to be undescribed.

HYPOPTA THEODORI, *n. sp.*

White; head white, the large eyes black; pectinations of antennæ blackish; collar white; thorax clothed with light gray hairs, mixed with white; legs heavily clothed, obscurely annulate with gray near the tips. Abdomen banded with clouded pale gray above, white below. Forewings white, the basal half immaculate except for a few minute black dots along the costal edge and internal margin. These dots become more distinct toward the apex on costa. In the interspaces, and beyond the cell from vein 2 to apex of wing, is a series of diffusely clouded, strigose, pale purplish-gray patches, separated by a white space along the veins, and divided also transversely in a somewhat irregular manner. Along the discal cross-vein and near the origin of the discal and subcostal venules, the colour of these markings shades into blackish, where they abruptly terminate. Terminally, they become more obscure and strigose, leaving the fringe white. Hind wings similarly marked, but the markings are entirely pale purplish-gray, and form a series of intervenular clouded spots in three or four indistinct rows between middle of wing and margin. Beneath the markings are repeated in a somewhat leaden gray, rather more diffusely than on upper surface. Costæ of both wings with a row of gray dots and terminal dots on both. Fringe white, as above. Expanse, 29 mm. Length of body, 15 mm.

Described from a single example taken July 16, at Las Cruces, New Mexico, "a dry, flat, sandy locality, with hardly any trees but cottonwood and cultivated fruits. Its altitude above the sea is 3,800 feet." I have named the species in honour of Mr. Cockerell, whose labours in the entomological field are worthy of general recognition.

A NEW LECANIUM FROM CANADA.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

In a box of Canadian Coccidæ lately sent to me by Mr. J. Fletcher, there are several species of *Lecanium*, including one which appears to be new, and is described herewith.

Lecanium Fletcheri, n. sp.

Belongs to subg. *Eulecanium.*

♀ Scale dark reddish-brown, hemispherical, shiny, not at all elongate, more or less wrinkled or with depressions; posterior cleft short, with one or two filaments of white secretion protuding from it. Length, 2 two-thirds mm., breadth nearly the same; height, 1½ mm. (apex depressed).

Derm yellowish-brown (prepared by boiling in caustic soda); distinctly reticulate, reticulations mostly hexagonal and pentagonal. Gland pits distinct towards the margin, numerous, large, sometimes in pairs. Margin with short simple spines, not very numerous.

Legs very small, ordinary; femur longer than tibia; tibia about ¼ longer than tarsus. Tarsal knobbed hairs very long and slender, with distinct though small knobs.

Antennæ 7-jointed; 1 longer than broad, 2 shorter than 1 or 3, 3 and 4 about equal, hardly equal to 1; 5 and 6 equal, and much shortest; 7 about or nearly as long as 5 + 6, and about as long as 2, or a little shorter. Formula 1 (34) (27) (56). The seventh joint has a false joint about its middle, which in one antenna was so distinct that it was difficult not to believe it a true joint. First joint with a long hair, second with two hairs, 4 and 5 each with a hair, 6 with two, 7 with three distinct hairs.

Larva: Of the usual shape, pale-yellowish; caudal filaments nearly straight but with an outward curve, the ends usually bending inwards and crossing. Each side of the abdomen with 7 short hairs. Last joint of antennæ emitting four long hairs. Legs with clubbed digitules about twice as long as the claw, and long tarsal clubbed hairs.

Food-plant: The specimens are labelled, "on Thuja, 'cedar.'"

Hab.: No locality is given by Mr. Fletcher; very probably the specimens were on a cultivated tree at Ottawa.

L. Fletcheri differs decidedly from any species hitherto found on coniferous plants, and seems most nearly allied to *L. quercitronis*, which it much resembles. Mr. Fletcher sent me some scales on *Quercus Coccinea*, which I believe to be *L. quercitronis*, Fitch. *L. Fletcheri*, compared with these, is shorter and more globose, and the posterior cleft is decidedly shorter.

Parasite: In a scale of *L. Fletcheri* I found three specimens of a Chalcidid parasite. I have not identified the species (very likely it is undescribed), but the following descriptive notes will probably suffice for its recognition :—

Head and thorax dark metallic green; abdomen brown, shovel-shaped; ovipositor just projecting. Eyes hairy. Antennæ brown, with the two joints before the club white. Tarsi 5-jointed, first joint of middle tarsus longer than $2+3+4$, last longer than $3+4$. Middle tibia with a very stout, straight spur, but front tibiæ with a smaller curved spur. Front femora brown, with the end white; middle femora whitish tinged with brown; hind femora all brown. Front tibiæ brown, with the end white; middle tibiæ white, with a brown cloud on proximal half; hind tibiæ brown, with both ends white. Tarsi all white. Wings hyaline; stigmal club bifid. A hairless line springs from near stigmal vein and proceeds obliquely downwards and inwards. Three long hairs spring from a point on the side of the abdomen.

SYNOPSIS OF THE DIPTEROUS GENUS PSILOCEPHALA.

BY D. W. COQUILLETT, LOS ANGELES, CAL.

The following table contains all the species of *Psilocephala* known to me as occurring in America, north of Mexico, with the addition of one species from Jamaica, West Indies. The *Thereva crassicornis*, Williston (Trans. Am. Ent. Soc., XIII., 293, *non* Bellardi), is a true *Psilocephala;* California specimens collected by Mr. O. T. Baron were submitted to me by Mr. J. M. Aldrich, of Brookings, South Dakota, who kindly placed his Therevidæ at my disposal. The *Thereva tergissa*, Say, is also a *Psilocephala;* specimens from Florida, the habitat of Say's original specimens, were contained in a very interesting collection of Therevidæ sent me by Mr. C. W. Johnson, of Philadelphia, Pa., who had identified the specimens in question as probably belonging to Say's species. As I cannot find that Say's name had previously been used in this genus, I have adopted it in preference to the later one, *corusca*, proposed by Wiedemann. *Psilocephala erythrura*, Loew, is evidently a synonym of *pictipennis*, Wied.

The *Thereva nigra* of Say, although placed in *Psilocephala* by Osten Sacken (Catalogue of the described Diptera, page 95), is a true *Thereva;* in his original description, Say distinctly says: "Hypostoma and all beneath with gray minute hair." I have a *Thereva* from Southern California which agrees in all respects with Say's description, and as other species

of this family are known to extend across the continent (I have examined specimens of *Thereva comata* from California and New Hampshire, *Psilocephala haemorrhoidalis* from New Jersey to Arizona), there is strong reason for believing that this is the true *Thereva nigra* of Say. For the species that has hitherto borne Say's name in collections, I have adopted Macquart's name of *haemorrhoidalis* (described under *Thereva*), since it is very probable that this author had specimens of the present species before him when drawing up the description to which the above name is attached.

Psilocephala melampodia, *platancala*, *variegata* and *levigata* are unknown to me except from the descriptions; of the remaining species I have seen only males of *melanoprocta* and *notata*, and only females of *rufiventris* and *scutellaris*.

The table of species is as follows:—

1. Fourth posterior cell open; front wholly opaque and covered with pollen 2
   Fourth posterior cell closed and usually petiolate 10
2. Femora black, or blackish-brown 3
   Femora and knob of halteres yellow ..... { *Slossoni*, n. sp. / *montivaga*, n. sp.
3. Wings destitute of blackish spots, except sometimes on the cross-veins 4
   Wings marked with over a dozen blackish spots, many of which are not situated on the cross-veins; abdomen wholly opaque; antennal style nearly half as long as the third joint ..... *tergissa*, Say.
4. Knob of halteres blackish-brown 5
   Knob of halteres, and hypopygium of male, yellow; first and third antennal joints subequal in length, the style nearly half as long as the third joint ..... *morata*, n. sp.
5. Thorax marked with light and dark coloured vittæ 6
   Thorax not vittate 8
6. Tibiæ yellow 7
   Tibiæ black, abdomen of female largely shining. *melampodia*, Loew.
7. First joint of antennæ much longer than the third, and extremely robust; California species ..... *crassicornis*, Will.
   First joint of antennæ much shorter than the third and not unusually robust; Florida species ..... *festina*, n. sp.
8. Tibiæ black, cross-veins of the wings not bordered with brown;

California species 9
Tibiæ yellow, cross-veins of wings bordered with brown ; Eastern species ..... *variegata*, Loew.
9. Third joint of antennæ scarcely longer than broad, pile in front of the halteres, and on the abdomen and legs, wholly white ..... *baccata*, n. sp.
Third joint of antennæ twice as long as broad, pile in front of the halteres, and on the abdomen and legs, largely black. *pavida*, n. sp.
10. Scutellum black 11
Scutellum orange-red, wings beyond the middle marked with two dark gray cross-bands ..... *scutellaris*, Loew.
11. Abdomen black 12
Abdomen largely orange-red, wings beyond the middle marked with two dark-gray cross-bands ..... *rufiventris*, Loew.
12. Wings destitute of dark-gray cross-bands 13
Wings beyond the middle marked with two dark-gray cross-bands, much abbreviated in the male ; two widely separated thoracic vittæ, and the apex of the scutellum, deep velvet black ..... *pictipennis*, Wied.
13. Front wholly opaque and covered with pollen, tibiæ largely yellow 14
Front partly shining 16
14. Knob of halteres, proboscis and palpi, yellow 15
Knob of halteres, proboscis, palpi and hypopygium of the male, black ; eastern species ..... *melanoprocta*, Loew.
15. Antennæ yellow ; California species ..... *marcida*, n. sp.
Antennæ black ; Jamaica species ..... *obscura*, n. sp.
16. Tibiæ largely or wholly yellow 17
Tibiæ and marginal cell wholly black ; California species. *costalis*, Loew.
17. Knob of halteres blackish 19
Knob of halteres and hypopygium of male yellow, front shining except on its lower corners 18
18. First joint of antennæ three-fourths as long as the third, wings hyaline, the veins never clouded with brown ..... *Aldrichii*, n. sp.
19. Femora blackish 21
Femora yellow 20
20. Pollinose spots on lower corners of the front contiguous ; wings nearly hyaline ..... *notata*, Wied.

Pollinose spots separated by a wide interval; wings smoky-brown..... *Johnsoni*, n. sp.

21. Front shining except on each lower corner.....22
Front having the lower third opaque pollinose..... *munda*, Loew.

22. Costal cell blackish-gray, veins bordered with brown. *platancala*, Loew.
Costal cell hyaline, veins not bordered.....23

23. Pollinose spots on lower corners of the front contiguous.. *notata*, Wied.
Pollinose spots separated by a wide interval.. *haemorrhoidalis*, Macq.

Psilocephala festina, n. sp.— ♂ Black, the abdomen brownish, the tibiæ and base of tarsi yellow. Front and face silvery-white pollinose, eyes narrowly separated by a white pollinose interval; first antennal joint two-thirds as long as the third, style slender, cylindrical, nearly half as long as the third joint, the latter one and one-fourth times as wide as the second joint; bristles of antennæ and of upper part of occiput black, pile of lower part of occiput and of the mouth parts white. Thorax lightly white pollinose and with three grayish-black vittæ, pile very short, mixed white and black, bristles black, pleura and scutellum white pollinose, scutellum bearing only two bristles. Abdomen wholly silvery-white pollinose and sparse white pilose, that on the hypopygium and on the fourth and following segments of the venter largely black; wings hyaline, apex of subcostal cell yellowish, fourth posterior cell broadly open.

♀ Same as the ♂, except: Front grayish-white pollinose. Abdomen shining, except a white pollinose spot on each side of the first, fifth and sixth segments and a crossband on the posterior margin of the second and third segments. Length, 6 to 7 mm. Florida (Johnson).

Psilocephala morata, n. sp.— ♂ Same as *festina*, with these exceptions: Palpi, knob of halteres and hypopygium yellow; upper third of the front brown pollinose, eyes not separated by a white interval; first antennal joint nearly as long as the third, the latter nearly twice as wide as the second. Thorax opaque, grayish-black pollinose. Scutellum bearing four bristles. Pile of entire venter white.

♀ Same as the ♂, except: Lower third of front white pollinose, the remaining portion blackish brown pollinose. Abdomen shining black, first segment and posterior margins of the second, third, fifth and sixth segments white pollinose, the narrow hind margins of the first three segments white; sparse pile of abdomen and venter largely black, except that of the first segment, which is light-coloured. Wings grayish-hyaline,

the stigma yellowish. Length, 6 to 7 mm. New Jersey, Florida (Johnson).

Psilocephala baccata, n. sp.—♂ Wholly black, including the tibiæ, halteres and hypopygium; posterior margin of the second and third abdominal segments, both dorsally and ventrally, sometimes narrowly white. Pollen of face grayish-white, that on the lower half of the front somewhat brownish, on the upper half black; pile of head white, a few on the front and vertex black, bristles of occiput and of antennæ black. First joint of antennæ nearly twice as long as broad, the third joint once and a-half as broad as, but not quite as long as, the first, being scarcely longer than broad. Thorax very lightly gray pollinose, not vittate, the pile and bristles black, the surface sparsely covered with appressed light-yellow tomentum. Pleura, abdomen and venter densely silvery-white pollinose and white pilose, pile of abdomen appressed. Pile of femora and coxæ white, the bristles, as well as those of the tibiæ and tarsi, black. Wings hyaline, stigma brown; fourth posterior cell open.

♀ Same as the ♂, with these exceptions: Pollen on upper three-fourths of front brownish-gray, that on the lower fourth white and with a round black spot next each eye at the junction of these two colours. Abdomen and venter shining black, the posterior margin of the second, third and fifth segments silvery-white pollinose, broadest on the fifth.

Length, 5 to 7 mm. Los Angeles and San Bernardino Counties, California. Twelve males and two females, in May.

Psilocephala pavida, n. sp.—♂ Differs from the above description of *baccata* only as follows: Third joint of antennæ twice as long as broad. Pile in front of halteres largely black; pollen of abdomen black, that on posterior margin of the second and third segments light-gray; pile of abdomen black, that on the first segment and apices of the remaining segments whitish. Pile of coxæ and femora largely black.

Length, 6 mm. Los Angeles County, California. A single specimen; in April.

Psilocephala montivaga, n. sp.—♀ Black, the knob of the halteres, femora, tibiæ, and base of the tarsi, yellow. Front brown pollinose, that next the antennæ yellow, a spot on each side next the eyes and a median triangle, black pollinose; face yellow pollinose; pile and bristles of antennæ, pile of front and bristles of occiput, black, pile of occiput and of mouth parts white. Antennæ of nearly an equal width, the third joint tapering slightly to the apex, first joint three-fourths as long as the third,

style one-fifth as long as the third antennal joint. Thorax yellow pollinose, that each side more gray, marked with three broad black stripes; pile of thorax short, sparse, mixed black and yellow, the bristles black; pleura gray pollinose, its pile white. Scutellum black pollinose, that on the margin grayish-yellow, its pile sparse, yellow, the four bristles black. Abdomen shining, except the first segment, base of the second and sides of the first four segments, which are gray pollinose; pile of the first four segments mixed yellow and black, that on the remaining segments wholly black. Wings grayish-hyaline, stigma yellow, fourth posterior cell broadly open.

♂ Same as the ♀, except that the abdomen is wholly silvery-white pollinose, its pile wholly yellow; hypopygium yellow, its pile yellow and black. Length, 10 to 13 mm. Los Angeles County, Cal. One male and two females, in June.

Psilocephala Slossoni, n. sp.— ♀ Black, the palpi, halteres, femora, tibiæ, and base of tarsi, yellow. Face and front grayish-brown pollinose, front with two velvet black spots at its middle adjacent to the eyes; pile of front, occiput, mouth parts and of antennæ whitish, bristles of antennæ and of upper part of occiput black; third antennal joint three-fourths as long as the first, scarcely wider than the second, first joint nearly twice as wide as the second, the style one-third as long as the third joint. Thorax brownish-gray pollinose, marked with two narrowly separated median grayish-black vittæ and with a much broader lateral one; pile of thorax light-yellow, the bristles black; pleura whitish pollinose and white pilose. Scutellum brownish-gray pollinose, white pilose, its four bristles black. Abdomen grayish-brown pollinose, that on apex of each segment broadly light-gray, the pile whitish. Wings gray, lighter in the middle of the cells, leaving a dark-gray border to the veins; stigma brown, fourth posterior cell broadly open.

Length, 10 mm. New Hampshire (Johnson). A single female specimen, collected by Mrs. A. T. Slosson, after whom the species is named.

Psilocephala Aldrichii, n. sp.— ♂ Black, the knob of the halteres, hypopygium, tibiæ and base of tarsi yellow, posterior margin of the second and third abdominal segments white. Front shining, its lower corners, not extending halfway to base of antennæ, white pollinose, like the face. Pile of mouth parts and of occiput white, that of the cheeks largely black, bristles of upper part of occiput and of the antennæ also black. First joint of antennæ three-fourths as long as the third, the

latter narrowly lanceolate, six times as long as the style. Thorax somewhat shining, marked with two white pollinose vittæ scarcely half as wide as the interval between them, and sometimes indistinct; pile of thorax and of scutelium whitish or yellow, that of the pleura white; scutellum bearing four black bristles. Abdomen lightly white pollinose, its sides, except on the first segment, shining, the pile white, that near the apex below and on the hypopygium sometimes partly black. Wings hyaline, the veins and stigma light-yellow; fourth posterior cell closed and petiolate.

♀ Same as the ♂, except that the abdomen is not wholly pollinose, and its pile is largely black. Length, 7 to 8 mm. New Jersey (Johnson), Montana, Wyoming (Aldrich), and California. Four males and one female, in July. I take pleasure in naming this species in honour of Mr. J. M. Aldrich, from whom one of the specimens was received.

Psilocephala Johnsoni, n. sp.—♀ Black, the femora, tibiæ, base of tarsi, and posterior margin of the second, third, fourth and fifth ventral segments, yellow. Front shining, each lower corner and the face white pollinose; bristles of antennæ and of upper part of occiput black, pile of lower part of occiput and of the mouth parts white; first antennal joint slightly longer than the third, the latter one-fourth wider than the second, style one-fifth as long as the third joint. Thorax grayish-brown pollinose, marked with two widely separated light-gray pollinose vittæ, the sides broadly shining; pile of thorax short, and like the bristles, black; pleura white pollinose, its pile white. Scutellum shining, except the gray pollinose margin, its bristles black. Abdomen shining, the first segment lightly white pollinose, posterior margins of the second and third segments white, a large white pollinose spot on each side of the fifth segment, the two spots almost contiguous; pile of abdomen mostly black; venter white pollinose, pile of the first three segments white, the rest black. Wings smoky-brown, the middle of some of the cells lighter, stigma darker brown, fourth posterior cell closed and petiolate.

Length, 9 mm. Florida. A single specimen received from Mr. C. W. Johnson, to whom it gives me pleasure to dedicate this interesting species.

Psilocephala marcida, n. sp.—♂ Black, the antennæ, proboscis, palpi, halteres, hypopygium, femora, tibiæ except apex of each, and base of tarsi, yellow, the femora and abdomen sometimes brown; posterior margin of the second, third, fourth and fifth abdominal segments, both dorsally

and ventrally, white. Head (usually) and entire body densely white pollinose, but that of the head sometimes yellow; the pile white. Antennæ having the first joint once and a-half as long as broad, slightly shorter than the third joint, the latter nearly as broad as long. Wings whitish hyaline, stigma yellow; faint clouds are perceptible on the cross-veins; fourth posterior cell closed and petiolate.

Length, 8 mm. Los Angeles and San Diego Counties, California. Two specimens.

Psilocephala obscura, n. sp.— ♀ Black, the palpi, proboscis, tibiæ, base of tarsi, knob of halteres, posterior margins of the second, third and fourth abdominal segments, and the greater portion of the three following segments, yellow. Front and face brownish-gray pollinose, short pile of front, bristles of antennæ and of upper part of the occiput, black, pile of lower part of occiput and of the mouth parts white; first and third antennal joints subequal in length, style one-third as long as the third joint, the latter nearly twice as wide as the second joint. Thorax grayish-brown pollinose and with two widely separated light-gray pollinose vittæ; pile of thorax mixed yellow and black, the bristles black; pile and pollen of pleura white, scutellum grayish-brown pollinose, that around the margin light-gray, the four bristles black. Abdomen shining, the first segment lightly pollinose, posterior margins of the second, third and fourth segments, and greater portion of the fifth and sixth, white pollinose; pile of first two segments yellowish, that on the remaining segments and on the venter largely black. Wings hyaline, stigma yellow, fourth posterior cell closed in the margin.

Length, 7 mm. Kingston, Jamaica (Johnson). A single specimen.

ON SOME LEPIDOPTEROUS LARVÆ ON ALFALFA.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA, W. I.

During the last two years a considerable number of rather small lepidopterous larvæ have been found on alfalfa *(Medicago sativa)* in Southern New Mexico. In the material collected there are nine distinct species represented. None of them have been bred. These larvæ are of considerable economic importance, as they occasion a certain amount of injury to the alfalfa crop, which is the surest and most paying crop of the Mesilla valley. They are of some scientific interest also, since hardly anything is recorded of alfalfa insects. It is therefore thought advisable to publish the following descriptions of these larvæ, which were made

some time ago, and which will serve to identify them on the alfalfa plant hereafter, besides giving an idea of the forms which occur on alfalfa in this locality. They were all collected in Las Cruces. The figures in parentheses refer to the alcoholic specimens of the species in the entomological collection of the New Mexico Agricultural Experiment Station.

(a).—Small, brownish and bristly Larva.

Stage 2.—Length, 2 to 2½ mm. Brownish or blackish. Five pairs of prolegs on segments 7 to 10 and 13. Head distinct, chitinous, shining polished black ; dorsum of prothorax also chitinous, emarginate behind, blackish. Rest of larva brownish, each segment with twelve circular dot-like raised blackish papillæ in an irregular transverse row, each papilla bearing a black hair. Rows on thoracic segments straighter. Head and prothorax also hairy. It is barely to be perceived that the whole integument is covered with microscopically short, bristly pubescence. Ten specimens.

Stage 3.—Length, 3 to 4 mm. Head black, variegated with brownish, or wholly very light, even pale-yellowish. Proscutum black. Ground colour of larva about same as in preceding stage ; tubercles a little more conical in form, black. The spiracles must not be mistaken for tubercles, the former being smaller and showing on most of the segments in all the stages. Microscopic bristly pubescence of integument slightly more evident. Seventeen specimens.

Stage 4.—Length, 5 to 5½ mm. Head usually very light, with four faintly mottled areas of brownish ; prothorax rather light, but oftener of the brown colour of rest of body. Tubercles more strikingly conical. The integument shows very plainly the short, stubby, whitish and brownish bristles, usually in longitudinal whitish and brownish rows. Nine specimens.

Stage 5.—Length, 5½ to 7 mm. Head large, very pale-yellowish, only three of the mottled faint brownish areas, the one near oral margin being more or less obsolete. Black tubercles or papillæ very conical ; hairs longer and stouter, the larva therefore appearing somewhat more bristly. The stubby, bristly growth of integument is very apparent in its narrow, longitudinal, alternating white and brown rows. Eight specimens.

Stage 6.—Length, 7½ to 9 mm. Head about same as preceding stage. Prothorax darker. The white longitudinal rows of stubby bristles showing most plainly in the median region, and on each side. Five specimens.

Stage 7.—Length, 9½ to 10 mm. Larger, brownish in general colour, broadly whitish laterally on sides, and the stubby bristles of integument showing very plainly, the white rows mostly on median region. Three specimens.

The above stages have been separated solely by examination, but are probably approximately correct. Described from alcoholic specimens, swept from alfalfa May 28, 1891. Specimens of the same larva, from 3 to 7 mm. long, had been previously swept from alfalfa, May 9 to 12. General colour noted in life. (Nos. 18, 30.)

(b).—YELLOWISH LARVA, WITH BLACK WARTS OR TUBERCLES.

Length, nearly 7 mm. Five pairs of prolegs, on usual segments. Hardly any hairs above, rather long hairs on sides and below, all these hairs directed downward. Head black, with a yellow triangular area in middle, and with yellowish oral region and antennæ. Prothorax with six black spiniferous tubercles in a transverse row, and two blackish markings on posterior border. Other thoracic segments with the same six black tubercles, and also with two similar but somewhat smaller yellowish tubercles, one on each side of the median pair of black ones. All the abdominal segments, except the anal, with the same tubercles as last two thoracic segments, but each in addition with a median anterior pair of small blackish tubercles situated between and slightly anterior to the median large pair.

One specimen, swept from alfalfa May 12, 1891. Colour noted in life. (No. 79.)

(c).—PALE GREENISH, NEARLY BARE LARVA.

Length, 8 mm. Light-greenish, inclining to brownish posteriorly, with a whitish stripe on each side of the body. Five usual pairs of prolegs. Integument bare and without hairs, except on venter. Head and feet light coloured, pale-yellowish. Methorax with a pair of black spots on dorsum, each spot just inside the lateral white stripe. Fifth (first abdominal) segment with a pair of larger black spots, one on each side just outside or below the lateral whitish stripe. Each of the lateral whitish stripes with two narrow brown lines running its whole length and more approximated to lower border. The greenish median portion has three lighter narrow longitudinal lines, one being median, and the outer ones very closely approximated to the lateral whitish stripes.

One specimen, swept May 9, 1891. Colour noted after a few days' immersion in alcohol. (No. 29.)

(d).—Pale-yellowish, rather stout and quite hairy Larva, with brownish stripes.

Length, 10 mm. Ground colour very pale-yellowish or whitish. Five usual pairs of prolegs. Head, prothorax, anal segment and whole ventral surface especially pale. A lateral rather wide stripe on each side encloses the spiracles; each section of it, corresponding to an abdominal segment (except on anal), marked by the spiracle in the centre, and extended into a sharp prolongation dorsad, ventrad and caudad (especially the first two), bearing a small dark papilla from which springs a long hair; a similar papilla below the sections bears a similar hair. Dorsum of larva with three pairs of brownish longitudinal lines, a median and two lateral ones. Between these are whitish and pale-brownish lines, the dorsal integument being covered with short, stubby bristles of these colours; and each segment with two pairs of light, smooth and naked tubercles, each bearing a rather long hair, the anterior pair of tubercles more approximated to each other than the hind pair. The head and prothorax also bear hairs.

One specimen, swept May 28th, 1891. (No. 228)

(e).—Green Larva, with a whitish line along each side of body.

Length, 14 mm. Venter light. Usual five pairs of prolegs. Whole surface of body, both above and below, evenly and quite thickly clothed with fine, short hairs. Head concolorous, similarly clothed with hairs. Hairs arising each from a small, black, dot-like tubercle, which occupies the centre of a circular naked areole, the rest of the epidermis being covered with microscopic black spines which appear only as closely approximated minute specks under a high power lens. These areoles are particularly distinct on dorsal regions, somewhat less so on sides of venter, the median ventral region and head not showing the microscopic epidermal specks. The dots from which the hairs arise are also absent on median ventral region. The principal segments show five transverse wrinkles or folds above, dividing the dorsum of the segment into six transverse sections; each section usually bears a row of areoles, though some have additional ones irregularly interspersed, which are usually smaller. These transverse wrinkles stop at the whitish lateral line on each side, which defines the lateral edge of dorsum.

One specimen, swept May 12, 1891. Colour noted in life. (No. 78.)

(f).—Green Larva similar to preceding.

Length, about 23 mm. This exactly resembles the preceding *(e)*, except in one or two details, which may indicate its distinctness, or may

indicate only a greater number of moults. If it is not the same, it is a very closely allied species. Colour is green, with two lateral longitudinal narrow whitish stripes, one marking the lateral edge of dorsum on each side and enclosing the spiracles, and in addition a median dorsal pair of similar stripes. Head is lighter than dorsum, approaching more nearly the colour of the stripes; venter light. The same microscopic black epidermal specks or spines are present, and the same naked areoles with dot-like tubercles in the centre, but the portion of the integument covered by the dorsal stripes has lost both apparently. These are shown, however, to be lost only in colour, the microscopic spines being apparent in the stripes where the integument is transversely folded, but they are concolorous instead of black. Their colour is also nearly lost on anal segment. Dot-like hair tubercles of head brown.

One specimen, swept Oct. 24, 1892. General colour noted in life. (No. 365.)

(g).—Very slender and elongated brownish Span-Worm.

Length, 9 mm. Two pairs of proportionally large prolegs, on segments 12 and 13. Colour brownish, with a somewhat lighter ventral line, and a pale lateral stripe or line on each side. Head, prothoracic segment and anal extremity light. Abdominal segments very elongated, almost bare, with some sparse minute tubercles giving rise to hairs. The main abdominal segments are more noticeable for being divided by minute transverse constrictions or wrinkles extending completely around the body into something like thirty or more transverse sections to the segment.

One specimen, swept May 28, 1891. Colour from alcoholic specimen. (No. 229.)

(h).—Pale coloured false Span-Worm.

Length, 4 mm. Three pairs of prolegs, on segments 9, 10 and 13. Light or pale coloured, with small brownish warts and hairs. Somewhat elongate, and rather slender. Segments not elongate. Head nearly concolorous, slightly more yellowish and polished. About twelve small, flattened-conical tubercles to each abdominal segment, each tubercle bearing a hair, and some smaller ones on ventral surface below. Tubercles in an irregular transverse row. Except the tubercles, the integument is apparently naked under the lens.

One specimen, swept May 28, 1891. Colour noted in life. (No. 230.)

(i).—LIGHT GREEN FALSE SPAN-WORM.

Length, 7 to 8 mm. Three pairs of prolegs, on segments 9, 10 and 13. Elongate and rather slim, light green in colour. Segments not longer than wide; with but very few short hairs, each arising from a minute pale brownish dot in centre of a rather indistinct tubercle, a dozen or so to each principal segment. Head likewise with hairs, which arise from less plain dots. In addition to these, there is on each side of segments 5 to 11 a conspicuous black tubercle bearing a hair, these tubercles being of same form as the others, but appearing much more conspicuous and larger because of the black pigment they possess.

Two specimens, swept May 12, 1891. (No. 80.)

NOTE.—The measurements given above were made from the alcoholic specimens, and are somewhat (usually a millimeter or so) less than what the same specimens measured in life.

CORRESPONDENCE.

REARING SPHINX CHRYSALIDS.

Sir: On the 30th of July, 1892, I saw a Sphinx larva digging into the ground at the foot of an ash tree, evidently with the intention of burying itself preparatory to transforming. I put it into a box I had in my satchel, and forgot it until three days after. When I opened the box there was a perfectly formed chrysalid instead. I placed it on the same bed that the *Quinquemaculata* of my former record had matured upon (CAN. ENT., Vol. 24, p. 237), and paid no further attention to it. On the 20th of June, 1893, that chrysalid gave forth a *Sphinx chersis*, Hub., large in size, perfect in form and rich in colouring. This surely proves that moisture is not an absolute necessity for the maturing of Sphinx pupæ, of these kinds at least.

In my earlier efforts to obtain moths from Sphinx pupæ I had no success. Being under the impression that moist soil was necessary for their maturing, all the careful attention I could give them was unavailing; they invariably died. Observing that soil getting between the segments of the abdomen irritated them greatly, and kept them constantly wriggling, I got some growing moss, put it on a plate, placed the chrysalids on it, moistening it slightly, when all my troubles with them disappeared,—no more moulding or drying up, they matured without fail, and the moths emerged in perfect condition. This simple method was to me a most gratifying success. I could now obtain the moths with no special attention required for the chrysalids.

In nature, the larva makes a cavity in the soil to transform in, pressing the soil firm and making the inside of the cavity as smooth as that of a silken cocoon. So that the pupa lies perfectly free, which will account for the fact that when placed in soil they always work themselves to the surface. Freedom from irritating matter is then, I suspect, one of the principal factors for successful maturing of them. And to those that have passed the winter in natural conditions, moisture may be another, but those that have begun their pupal existence in unnatural conditions do not seem to feel the need of it.

We know that it is comparatively an easy thing to get the pupa from a sphinx larva, besides getting the imago from the pupa; if, then, such pupæ can be matured without the labour and care required to get up and maintain "natural conditions," with the probability of a disappointing failure at the end of it all, what an inducement it would offer to many to undertake the rearing of them who are now prevented from attempting it by the elaborate preparations that seem required to ensure success. Whilst, if safety and a soft bed is all that is required for success, many a valuable chrysalid that is now rejected or neglected, under the impression that it would be hopeless to attempt to rear it with the means they have on hand, might be reared to add rare forms to a collection, or even to aid in the identification of earlier stages of some of the species. An experiment on an extensive scale in this direction is well worth the making.

J. Alston Moffat.

BOOK NOTICE.

BRIEF GUIDE TO THE COMMONER BUTTERFLIES OF THE NORTHERN UNITED STATES AND CANADA: by S. H. Scudder. Henry Holt & Co., 12mo., pp., XI + 206., 1893.

It has been known for some time that Mr. Scudder has in preparation a Manual of the Butterflies of the Northern United States and Canada, similar to Gray's Manual of Plants, and all must agree that such a work is much needed. The present "Brief Guide" has, however, been produced in the meantime to meet a demand for something even less technical, by means of which boys and girls might be tempted to enter the ever charming fairy-land of science by having an easy way laid open before them. There are few objects in nature which so soon thrust

themselves upon the notice of young people as flowers and insects, and of these none have been so useful as a first stepping-stone or allurement to the realms of Natural History as butterflies,—" those winged creatures of beauty which add such a charm to the summer landscape."

There was not, however, until now any work which could be placed in the hands of boys or girls who had caught a common butterfly, by means of which they could identify and find out something of the life-history of their newly-found treasure. This want Mr. Scudder has filled with his Brief Guide, in which he treats chiefly of " those butterflies—less than a hundred of them—which would almost surely be met with by any industrious collector in the course of a year's or two years' work in the more populous Northern States and in Canada." Should a young collector, therefore, be lucky enough to capture a butterfly not mentioned in the book, he may be sure that he has taken a rarity, which, as the author remarks, is " a discovery not always distressing to the amateur." The introductory chapters, upon some of the points which will at once present themselves to a beginner, are excellent—concise, clearly expressed and accurate, and treat of such subjects as :—What are butterflies? their structure, habits, variations, and life-histories. There are three keys for identification, based on the perfect insect, the caterpillar and the egg, and pages 63 to 174 are taken up with short accounts, systematically arranged, of the insects treated of. There is a short glossary and an appendix giving instructions for collecting, rearing and studying butterflies.

On the whole this is a very useful little work, well prepared, convenient in size, well printed and well got up. It is, of course, arranged after the same system as Mr. Scudder's great work, " The Butterflies of the Eastern United States and Canada," and many of the views there expressed are repeated here. The nomenclature is also the same, but the names more frequently used by other authors are also given. A good feature of the work is that the proper pronunciation of every name is shown by accents, and a popular English name is given for each species. The author's observations on dimorphism of some species, as of *Colias Eurytheme* and *Papilio Ajax*, do not seem quite to agree with those published by Mr. W. H. Edwards. It would be difficult, however, to treat such subjects fully in the space allotted to each species in this Brief Guide, which, we think, all who use it will agree is too brief, and they would like much more of it, of the same style.—J. F.

Mailed September 9th.

The Canadian Entomologist.

VOL. XXV. LONDON, OCTOBER, 1893. No. 10.

WASHINGTON TENTHREDINIDÆ AND UROCERIDÆ.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The specimens on which the present paper has been based were collected by Mr. Trevor Kincaid, of Olympia, Washington. They were all collected near that city except a few, which were taken along the Skokomish River. Great credit is due Mr. Kincaid for bringing together so large a collection. The specimens are deposited in the entomological collection of Cornell University.

TENTHREDINIDÆ.

Trichiosoma † *triangulum*, Kirby.

3 ♂ ♂, June 6, 22, 23, 1892. They agree perfectly with Norton's description of this species, except the apical segments of the antennæ, which are entirely black.

Zarea americana, Cress.

2 ♀ ♀, April 17 and May 23, 1892.

Hylotoma abdominalis, Leach.

1 ♀, May 3, 1892. Skokomish River.

Hylotoma Macleayi, Leach.

1 ♀, May 11, 1892.

Euura abbiricta, Cress.

1 ♀, Skokomish River, May 8, 1892.

Nematus castaneus, Kirby.

A single female, which in all probability belongs to this species, has two broad black bands on the lateral lobes of the mesothorax and two less distinct bands on the median lobe; the square spot on the vertex is fuscous, a small spot between the antennæ and the base of the sinus from

N.Y. ACADEMY OF SCIENCES LIBRARY

† The following is omitted from Cresson's synopsis. It will probably prove to be a variety of *triangulum* and not the European species.

vitellina, Linn.

1882. *Trichiosoma*, Kirby, List Hymen., Brit. Mus., I., 10.

Habitat.—Vancouver's Island, Rocky Mountains, (Europe).

above the antennæ to the clypeus is black; the clypeus is distinctly emarginate, and just beyond the middle of the second submarginal cell there is a small fuscous speck.

Nematus luteolus, Nort.

Two males, which I think belong here, have a broad margin to the abdominal segments; the margin is broadest on the middle segments, almost interruptedly transversely fasciate, the apex of the abdomen and the entire venter honey-yellow.

Nematus, Sp.

There are six species in the collection which are probably new; in the present state of the genus it seems best to leave them undescribed.

Messa atra, sp. nov.

Head, labium, mandibles, antennæ, thorax, abdomen, coxæ except at apex, and femora at middle, black; clypeus acutely emarginate, labium broadly rounded; head and thorax sericeous; middle mesothoracic lobe with a central groove on its anterior half; abdomen black, apical segment above slightly rufous; coxæ black, at apex fuscous; femora at base and apex white, with a broad median black band; anterior and middle tibiæ fuscous, darker beneath, hind tibia black, at base white; spurs fuscous; anterior and middle tarsi at base fuscous, apex black, hind tarsi black; wings hyaline, veins piceous, stigma lighter at base. Length, 7 mm.

1 ♀, April 14, 1892. Related to *salicis*, Ashm., but differs by its rounded labium and black abdomen.

Dolerus borealis, sp. nov.

Body stout, black, except the two lateral lobes of the mesothorax, which are reddish-brown; head, thorax and pleuræ densely coarsely punctured; antennæ slender, third and fourth joints subequal; clypeus deeply emarginate; two feeble longitudinal sinuses on the vertex each side of the ocelli; body densely sericeous, especially around the mouth and on the legs; inner tooth of claw stout, distinct; wings slightly fuscous, veins, costa and stigma black. Length, 11 mm.

2 ♀ ♀, May 22, 1892.

Dolerus sericeus, Say.

3 ♀ ♀, May 11, June 6, 1892, and April 20, 1893. This last specimen measures 12 mm., and the wings are clearer than in typical specimens, but otherwise I can find no distinguishing character.

Blennocampa atrata, sp. nov.

Shining black; antennæ as long as head and thorax, third joint more than twice as long as fourth; clypeus truncated, labium small, triangular; femora at apex, front and middle tibia before, hind tibia, except at apex, and basal membrane, smoky white; wings transparent, slightly washed with yellowish, veins, costa and stigma black, transverse marginal nervure received a little beyond the middle of the third submarginal cell. Length, 7 mm.

1 ♀, May 7, 1893.

Monophadnus atracornus, sp. nov.

Shining black, impunctate; head entirely black, apex of clypeus slightly emarginate; antennæ as long as head and thorax, third joint one-third longer than fourth; tegulæ, apex of all the femora, the tibiæ and front and middle tarsi, except at apex, white; apex of all the tibiæ, the apex of the front and middle tarsi and the whole of the hind tarsi, infuscated or black; wings hyaline, slightly smoky, iridescent, costa and stigma brownish; transverse marginal nervure bowed, received near the apex of the third submarginal cell. Length, 7 mm.

2 ♀ ♀, May 18, 1892; April 30, 1893. Most closely allied to *M. tiliæ*, Nort.

Hoplocampa pallipes, sp. nov.

Head ferruginous; antennæ, small square spot between antennæ, apex of mandibles, spot at ocelli, black; clypeus emarginate, labrum rounded; antennæ not pilose or hairy; thorax light ferruginous, prothorax and collar narrowly margined with black, tegulæ and pleuræ testaceous; abdomen short, broad, broadest at middle; the basal plates, the venter, a narrow lateral margin, and the three apical segments ferruginous, the remainder of the dorsum black, in one specimen the basal plates are black; legs entirely ferruginous, sericeous; wings hyaline, veins luteous. Length, 5 mm.

3 ♀ ♀, Skokomish River, May 8th.

Monostegia Kincaidii, sp. nov.

Head, antennæ, labium and mandibles black; face sericeous; antennæ reaching to base of thorax, flattened, third joint scarcely longer than fourth; clypeus slightly emarginate; thorax black, prothorax narrowly margined with white; abdominal segments one to five with basal whitish bands, broadly interrupted at middle, segments three to six very narrowly tipped with white; legs black, apex of anterior femora

and tibia beneath white, middle and posterior tibiæ densely sericeous ; wings hyaline, slightly obscure, veins black, costa and stigma brownish, first branchial and second submarginal cells with a black dot. Length, 7 mm.

1 ♂, 7 ♀ ♀, April 17, 1892, on the catkins of *Salix flavescens*, and May 7th, 1893. Two specimens with the venation of *Harpiphorus* probably belong here.

Labidia opimus, Cress.

1 ♂, June 25, 1892.

Macrophya californica, Nort.

Three females, two from the Skokomish River, May 5th, on *Ribes bracteosum*. These specimens do not agree perfectly with Norton's description, but they differ more among themselves than from the description. The interrupted band on the abdomen and the black spot on the hind coxæ are wanting, in one specimen the abdomen is reddish-brown, and the antennæ, except the basal segment, entirely black.

Macrophya oregona, Cress.

1 ♀.—Differs from Cresson's description only in having a small white spot on basal plates.

Macrophya magnifica, sp. nov.

Black ; labrum, clypeus, mandibles, except at tip, palpi, cheeks, an elongate spot on inner orbits above the antennæ, spot beneath the antennæ, the carina above the base of the antennæ, tegulæ, a broad band on collar, subinterrupted at middle, a large spot on each thoracic pleura, the scutellum, lines on the sides of the thorax and at the base of the wings, the edges of the basal plates, a band extending along the edge of the abdomen from the basal plates to the apex of the seventh segment, band broadest on the venter, legs, except a line above and the apex of the posterior femora, which are black, olive-white ; antennæ, sternum, venter except the lateral yellow band, and back of the head, black ; the five apical segments of the abdomen and the saw reddish-brown ; the basal segment of the antennæ large, globular, the third as long as the fourth and fifth together ; wings slightly infuscated, veins black, the costa and stigma at base brownish ; lanceolate cell with a straight cross-nervure. Length, 12 mm.

1 ♀, June 4, 1892.

Strongylogaster pacificus, sp. nov.

Female.—Black; head and pleuræ covered with a dense sericeous pile; third and fourth antennal joints subequal; sinus at sides of ocelli almost reaching the back of the head; head and thorax remotely and coarsely punctured, the palpi, the tegulæ, the front angles of the thorax, the coxæ except at base, the trochanters, the front femora, the apical half of the middle and hind femora, the front and middle tibiæ, the basal half and apex of the hind tibia, and the front and middle tarsi, white; abdomen, except the basal plates and the first segment, which are black, honey-yellow; apex of the abdomen with a whorl of black hairs, concealing the saw, the venter honey-yellow, with a narrow black band along each side; wings transparent, their base and the costa yellow, the stigma brown, its lower edge lighter, lanceolate cell without oblique cross-vein, hind wings with two middle cells. Length, 6–8 mm.

Var.—Black markings of the legs less distinct, dorsal abdominal segments 3–5 with a small fuscous spot at middle, segments 6–9 with a transverse black band, covering almost the entire segment, apex black.

Male.—Does not differ except in wanting the whorl of hairs at the apex of the abdomen and in having all the legs white.

14 ♂ ♂, 3 ♀ ♀, May 18–22, 1892; April 30, May 7, 1893; a single male from the Skokomish River.

Strongylogaster primativus, sp. nov.

Female.—Black, antennæ short, third and fourth joints subequal; clypeus and labrum dirty white; head sparsely punctured, thorax impunctate; the tegulæ, the front angles of the thorax the coxæ except at base, the trochanters, the apex of the femora, the front and middle tibiæ (in some specimens slightly clouded), the base of the posterior tibia, and the base of the front and middle tarsi, waxen white; abdomen black, venter and pectus black, the venter margined each side with a yellow band, in some specimens these bands coalesce on the venter and form a narrow margin on the dorsum; wings hyaline, yellowish at base, veins black, the apex of the costa and stigma black, lanceolate cell open, with a perpendicular cross-nervure, in some wings the cross-vein is represented only by points on the longitudinal veins, hind wings with two middle cells. Length, 9 mm.

Male.—Smaller, not so robust, legs whitish-yellow, except the posterior tibiæ and tarsi, which are fuscous; a narrow margin to abdominal segments 2-5, and the apex of the abdomen yellow.

1 ♂ and 15 ♀ ♀, April 20 and May 19-23.

Tenthredo Barnstonii, Kirby.

1 ♂, poor condition; the legs are entirely ferruginous, the hind legs are darker than the anterior ones.

Tenthredo nigricostata, Prov.

1 ♀, July 22, 1892. This is probably the same as *erythromera*, Prov.

Tenthredo xanthus, Nort.

1 ♀, May 21st. The light spot above the coxæ and the black lines on the tergum are wanting. There is a black dot above the base of the antennæ.

Tenthredo scaevola, Cress.

2 ♀ ♀, May 7, 1893.

Tenthredopsis transversa, sp. nov.

Black; clypeus white; palpi, tegulæ, collar, narrow elongated spot from tegulæ, apices of the coxæ, the femora, except a black line above, the front and middle tibiæ, a line on the hind tibia beneath, the front and middle tarsi beneath, the venter, a narrow margin to abdominal segments 2–5, and the apex of the abdomen, yellow; the basal membrane and very narrow margin to abdominal segments 6–8, white; the clypeus slightly emarginate, the vertex finely punctured; the thorax impunctate; antennæ long, slender, black, segments 3–5 equal; wings transparent, veins black, costa and stigma lighter at base; hind wings with two distinct middle cells. Length, 8 mm.

2 ♂ ♂, May 18, 1892; May 7, 1893.

Tenthredopsis ruficorna, sp. nov.

Black; the clypeus, the labrum, the mandibles, except at tip, a spot between the antennæ, two spots above the antennæ, the cheeks, a broad postocular band, an interocular band, broader from opposite antennæ below, continued narrowly to the postocular band, the prothorax, tegulæ, a spot below the tegulæ, a trapezoidal spot on pleuræ, a spot above posterior coxæ, a slender line above this spot, front and middle coxæ, and posterior coxæ, except two longitudinal black lines, waxen white; antennæ, except two basal joints, black, honey-yellow above; cenchri, abdomen, except immediate base of basal plates, and legs, except coxæ, honey-yellow; clypeus scarcely emarginate, labrum rounded; segments 3–5 of antennæ subequal; wings yellowish-hyaline, veins fuscous, costa and stigma honey-yellow; hind wings with one or two middle cells. Length, 11 mm.

1 ♀, May 22, 1892. This may prove to be a variety of *Tenthredo ruficoxa*, Prov.

Lyda olympia, sp. nov.

Ferruginous, shining; segments 10–24 of antennæ, spots at base of antennæ and narrow line between, beneath the ocelli, prothorax, metathorax above and on sides, basal plates, the sutures of the venter, and the apex of the abdomen, black; cheeks, clypeus, interior orbits and between the antennæ, yellowish; antennæ twenty-four-jointed, first and third segments subequal, third segment three times as long as fourth; posterior femora infuscated at base, otherwise the legs entirely ferruginous; front tibia with a single side spur; wings yellowish-hyaline, veins yellowish, stigma darker at base, third submarginal cell broader and slightly longer than second, second branchial cell without cross-nervure; hind wings with apparently three closed cells. Length, 14 mm.

1 ♂, June 11, 1892. This may be *bucephala*, Cress.

UROCERIDÆ.

Oryssus occidentalis, Cress.

1 ♀, the head is wanting, but the specimen without much doubt belongs to this species. The two basal abdominal segments are black.

Urocerus albicornis, Fabr.

1 Female.

Urocerus apicalis, Kirby.

1 ♂. The last dorsal abdominal segment is flattened.

Urocerus Behrensii, Cres.

1 ♀, probably belongs here, the wings are entirely fuscous, the apex of the antennæ and all the tarsi are yellow.

Urocerus flavipennis, Kirby.

3 ♀ ♀. One from the Skokomish River, Aug. 7. Only one specimen has the spots on the side of the abdomen, another has the antennæ entirely yellow.

Urocerus indecisus, sp. nov.

Antennæ, head, thorax, basal plates, first and apex of the last abdominal segment, a band each side below, and all the legs except the two apical segments of the tarsi, black; the remainder of the abdomen and tarsi brown; antennæ twenty-two-jointed; wings slightly fuscous, the veins black, the second transverse cubital vein with a stump of a vein on the inner side; cornus long, suddenly narrowed at apex, apex with several teeth. Length, 16 mm.; alar expanse, 26 mm. 1 ♂.

Urocerus riparius, sp. nov.

Black; clypeus, labrum, mandibles except at tip, spot behind the eye, joints 3-9 of the antennæ, prothorax, apex of the front and middle femora, their tibiæ and tarsi, the base of the hind tibia and metatarsus, the two apical segments of their tarsi, and abdominal segments three to six, yellow; antennæ twenty-one-jointed, the yellow band on the antennæ is clouded with fuscous and varies in width; wings yellow, slightly clouded, veins black. Length, 22 mm.; alar expanse, 33 mm. Two males, one from Skokomish River, May 3.

DESCRIPTIONS OF THE LARVÆ OF CERTAIN TENTHREDINIDÆ.

BY HARRISON G. DYAR, NEW YORK.

Hemichroa americana, Provancher.

(The alder saw-fly).

Described as a Dineura, but the lanceolate cell is contracted in the middle, not petiolate. The second recurrent nervure is received very near the end of the second submarginal cell, almost at the intersection of second and third submarginal cells.

♂.—Shining black, the legs brownish-yellow, all the coxæ, the apical third of posterior tibiæ and posterior tarsi black. Wings smoky, but hyaline along the outer margin. Nervures and stigma black.

♀.—Head and body yellowish-brown; antennæ, eyes, metathorax and legs as in the ♂, black, or all the femora more or less black. Black markings somewhat variable.

A smoky spot in the centre of the second submarginal cell in both sexes.

15 ♂ ♂, 8 ♀ ♀.—Bred from larvæ on *Alnus serrulata*, at Woods' Holl., Mass., and Rhinebeck, N.Y.

Eggs.—Laid in saw cuts opening below on the petiole and base of midrib of a leaf. The cuts are in one or two rows, along one or both sides of the rib, nearly contiguous.

First stage.—Eating a little hole or slit through the leaf. Head rounded, higher than wide, pale brown, eye black; width, 0.3 mm. Body curved into an S shape outside of the hole in the leaf, through which the larva readily moves. Translucent honey-yellow, annulate, scarcely shining; the alimentary canal gives a greenish tinge by transparency.

Second stage.—Much as before. Width of head, 0.4 mm. Body rather dark honey-yellow, greenish tinged. Two transverse rows of subconical tubercles are seen on each segment, bearing minute setæ which are blackish.

Third stage.—Head brown, shining, eye black, mouth dark; width, 0.55 mm. Body greenish-yellow, rather sordid and only slightly shining. Thoracic feet slightly marked with black and traces of lateral and broken substigmatal black lines appear, most distinct centrally. Setiferous tubercles blackish.

Fourth stage.—Head minutely pilose, blackish-brown, eye black; width, 0.75 mm. Thoracic feet pale. Body marked as in the next stage, but the tubercles are larger in proportion, and the subventral black patches are rounder and more evidently cover the anterior and posterior patches of tubercles.

Fifth stage.—Head brownish-black; width, 1.0 mm. Practically as in the next stage. The body tubercles are tinged with brownish.

Sixth stage.—Head well-rounded, slightly acute at vertex, not conspicuously flattened before; shining black, sparsely pilose; width, 1.4 mm. (or as large as 1.7 mm. in some ♀ ♀). Thoracic feet spreading, black, pale at the joints. Abdominal feet present on joints 6–12 and 13 posteriorly (22 feet). Body smooth, subannulate or creased, not shining. colour subtranslucent greenish-ochre, with an even, continuous, black lateral line, and a geminate interrupted subventral one. Two transverse rows of smooth, inconspicuous, concolorous, setiferous tubercles on each segment, of moderate size and arranged subventrally in the black patches in clusters. Venter pale. Joints 2 and 13 posteriorly of a darker ochre. The larvæ rest on the edge of a leaf, and lash the posterior part of their bodies vigorously when disturbed, holding on to the leaf by the thoracic feet.

Seventh stage.—The larvæ do not feed in this stage, but enter the ground soon after moulting. Head as before, its width the same (1.4-1.7 mm.) Body much the same, but smooth. The tubercles are represented by elliptical watery areas in three rows on each segment, with rudimentary setæ. The colour is a rather opaque yellow, with no shade from the alimentary canal. The black marks are the same.

Cocoon.—Formed beneath the ground; thin, crusty and brittle; elliptical and of uniform texture, brown in colour. Size, 8x4 mm.

Pupa.—Much like the mature insect, but with rudimentary wings. All brownish-yellow, the legs, cases and antennæ darker, eyes blackish.

The flies emerged in August.

Cræsus latitarsus, Norton.

(The white birch saw-fly.)

Eggs.—Laid closely along the midrib or larger veins on the under side of the leaf, about half enclosed in median saw-cuts which are distended by the eggs so that they lie obliquely in contact. Soft, translucent white; seen to be very minutely punctured under a magnification of 60 diameters. Size, 1.4x.6 mm.

First stage.—Eating holes through the leaf, which soon become confluent; lashing the body. Head round, a little higher than wide, full at vertex; shining black; width, 0.4 mm. Body light shining greenish. Tubercles very obscure, not setiferous, only the subventral ones distinct and nearly concolorous. Thoracic feet blackish; the segments of body obscurely annulate.

Second stage.—Head very smooth, even brownish-black, pale above the mouth; width, 0.55 mm. Body olive-green, the subventral ridge and feet blackish. No setæ seen.

Third stage.—Head black; width, 0.75 mm. Much the same.

Fourth stage.—Head, 1.05 mm. wide. Markings much as before.

Fifth stage.—Head round, full at vertex, well rounded, not pointed, without trace of sutures; flattened in front over clypeus, with a few slight clypeal dents. Entirely shining black; width, 1.6 mm. Body indistinctly 4-annulate, watery shining smooth; no dots, but minute black setæ represent them. Thoracic feet large, spreading, black, pale centrally. Abdominal feet present on joints 6-11 and 13 (20 feet), with a medioventral eversible gland, posterior to each pair on joints 6–10. These glands are longer than the feet, when everted, are coloured rather darker than the body. When disturbed the larva throws its body up over its head and the ventral glands are quickly everted and retracted. Ground colour honey-yellow heavily shaded with greenish black, the yellow appearing on joint 2 anteriorly, stigmatally and on the abdominal feet.

Sixth stage.—Width of head, 2.2 mm. As before, but smooth; no setæ seen. Joint 2, the dorsal and stigmatal irregular bands and abdominal feet honey-yellow, leaving the black shading most distinct subdorsally

and substigmatally, forming a series of very black subdorsal patches or spreading largely over the body. At the end of this stage the larva enters the earth without moulting.

Cocoon.—Formed beneath the ground; elliptical, rather thick, firm, opaque, black. Size, 11 x 4.5 mm. Imagos appeared August 1. Larvæ found on the leaves of *Betula populifolia* at Woods' Holl., Mass., and Plattsburgh, N. Y.

Fenusa varipes, St. F.

(The imported alder leaf-miner.)

Abundant on *Alnus serrulata* at Woods' Holl., Mass., causing the leaves to turn brown and fall.

Egg.—A slight circular swelling in the leaf, visible on both surfaces, 0.5 in diameter. The egg is thin, delicate, milky white, about 0.3 mm. in diameter, inserted under the epidermis by a saw cut.

First stage.—Mines under the upper epidermis usually less than 1 mm. in diameter, rarely as large as 1.5 mm., starting from the egg puncture. Head much flattened, broader than long, mouth parts projecting, the lateral lobes bulging, pale watery brownish; width, 0.25 mm. Body flattened, deeply incised, joint 2 wide, joints 3–4 rapidly tapering, the rest of even width, joint 13 rounded. Feet imperceptible with a lens. Colour translucent watery, scarcely whitish, alimentary canal green. Length, 1 mm.

Second stage.—Like the preceding stage, but thoracic segments larger and body more deeply incised. Milky translucent, the alimentary canal green, head brownish, 0.3 mm. wide. Feet very rudimentary, but visible. Cervical shield present, large, not very distinct. Burrow about 3 mm. diameter.

Third stage.—As before. Width of head, 0.4 mm.; diameter of burrow, about 6 mm.

Fourth stage.—Much as in the next stage. Cervical shield covering the anterior half of joint 2, very faintly brownish, as are the thoracic feet. Head rather paler than in the next stage, 0.55 mm. wide. Burrow about 10–12 mm. in diameter.

Fifth stage.—Head much flattened, mouth projecting in front, clypeus occupying the central third of what is the upper surface; lobes rounded, projecting laterally; ocellus nearly central. Colour honey-brown, paler, almost whitish toward vertex, which is withdrawn beneath joint 2; mouth dark brown, eye black; width, 0.75 mm. Abdominal feet very rudi-

mentary, present on joints 5-12 (none on joint 13). Thoracic feet small, almost lateral, indistinctly jointed, faintly brownish, not used. Body flattened, rounded, of nearly even width, segmental incisures distinct and broad, segments faintly 3-annulate. Colour shining whitish, subtranslucent, the alimentary canal green. No anal plate, but a very large, bisected, brownish cervical shield. No tubercles nor setæ distinguishable. Burrows large, spreading from 28-35 × 14-9 mm., often becoming confluent with others over the whole leaf, transforming the upper surface into one continuous brown blister.

Sixth stage.—On attaining this stage the larvæ burst through the upper epidermis and fall to the ground, eating nothing after the moult. Head slightly darker than body, shining, mouth brown, eye dark brown ; width, 0.75 mm. Body shining pale yellowish-white, with no discolorous shade from the alimentary canal. On joints 5-12 two watery transverse areas on each segment, the anterior composed of two dorsal dots, the posterior of two elongate pyriform subdorsal patches, slightly elevated and connected over the dorsum. Feet concolorous. Length, about 5.5 mm.

Pupa.—Formed in an elliptical cell in the ground ; entirely pale yellowish, the eyes brown-black.

(TO BE CONTINUED.)

DESCRIPTION OF THE PREPARATORY STAGES OF NEMEOPHILA SCUDDERI, PACK.

BY H. H. LYMAN, MONTREAL.

Eggs laid July 9-10. Round, considerably flattened at base, honey-yellow, shining, under a microscope very slightly and irregularly pitted, $\frac{1}{100}$ of an inch in diameter.

Hatched July 17-18, egg period eight days.

Young larva.—Length, about one-tenth of an inch. Head brown, rather lighter below. Body, dull greenish-yellow, with lead coloured warts and long hairs of a brown colour.

I failed to observe the first moult, but the following description was taken on August 16th, just before what I believed to be the second moult. Length, $\frac{5}{16}$ to $\frac{3}{8}$ inch. Head small, slightly and obtusely bilobed, black and shining, with a few hairs about mouth parts.

Body above generally dark, but occasionally rather light in colour, with 10 or 12 warts on each segment. These warts are round, black and

shining, clothed with dense tufts of black hairs, mixed with reddish-brown ones on the top of the 5th to the 9th segments. Below greenish-black, feet and prop-legs concolorous and semi-transparent.

After second moult.—Length, ⅜ to ½ inch. Same as before, except that the skin is blacker and there are some rather long tufts or pencils of hair on the hind segments, and there is a patch of foxy hair on the top of the 5th, 6th and 7th segments. Feet black.

After third moult.—Length, ⅝ to 1¼ inch. Head black, slightly and obtusely bilobed.

Body black, the warts, 10 or 12 on each segment, are black and shining, and arranged in a transverse row of 10, with two in front of the general line in the middle, thus . . . . . The warts are furnished with radiating tufts of bristles, which are either black, foxy-red or yellowish, according to their position. Those on the top of the 5th, 6th and 7th segments are foxy-red, and those on the two lowest lateral rows of warts and the lower hairs of the third row are of a yellowish-brown colour. The rest of the hairs are black, and those towards the anal extremity are rather longer than the others. Feet black, prop-legs dark, with a small wart, with a few short bristles on the outside of each; segments without prop-legs have small warts underneath.

Passing 4th moult September 6th.—

After fourth moult.—Length at rest, ¾ inch; in motion, ⅞ inch. Colours the same as before, but with more foxy-red, which now extends from the 5th to 9th segments inclusive, and is not confined to the top, but extends down to meet the lighter coloured hairs along the sides, so that the black hairs are confined to the upper part of the 2nd to 4th and 10th to 13th segments, and a few along the sub-dorsal region on the 7th to 9th segments.

Began spinning up about 14th September. A very slight cocoon is made by drawing together leaves or frass with a few threads, and some of the hairs from the body woven in. In this the caterpillar lies sluggishly for several days before casting its skin and becoming a pupa.

Pupa.—Length, ½ to ⅝ inch, rounded head and pointed tail, dark brown in colour.

So slight were the cocoons that nearly all the pupæ slipped out of them.

Though most of the larvæ went on to pupation, a few seemed determined to hibernate full grown, and so were placed in a box in an outhouse, but did not survive.

On 9th October I left home for a few days, but before doing so placed the pupæ in the cellar, as I did not expect the imagos to emerge till spring; but on examining the cage on 22nd October, after my return, I found that two or three had emerged in a crippled condition. I thought this might be caused by the dryness of the house, so tried to moisten the air by putting a wet sponge in the cage and in other ways, but they still continued to emerge crippled, and some only partially emerged.

On the 29th October I found one which had emerged, but the right wing cover was still adhering to the wing. I removed it with difficulty, many of the scales coming off with it, but none of the wings developed at all.

Mr. Winn suggested that perhaps the trouble arose from the absence of the cocoon, slight as it is, and I therefore tried the experiment of placing the pupæ in empty cocoons of *Halesidota caryæ*. This seemed to improve matters, and I succeeded in getting a few perfect specimens. One perfect female emerged and was left in the cage with two males for two days, in the hope of securing another lot of eggs, a large box of plantain having been brought into the house for feeding purposes. I was unable to watch these specimens, but as I did not suppose that a virgin female could pass two days with two males without being impregnated, I put the males in a cyanide bottle and the female in a pill box. A supply of eggs was secured, but they proved to be sterile.

About a dozen of the pupæ enveloped in the Halesidota cocoons, showing no sign of disclosing the imagos, were later placed again in the cellar in the hope and expectation of their maturing in the spring, but all were found to be dead on the return of that season. The larvæ fed readily on plantain, but were at all times very slugglish. Unlike most larvæ with which I have had anything to do, the faces were not cast in moulting in the usual manner, but remained attached to the skin.

In one case which was watched, the skin split along the side of the fore-part of the body. The larva rested for a time, and gathered strength for a further effort. The skin split further along and the larva again rested. Another effort, and the head was withdrawn, and then the caterpillar struggled out of the old skin. Immediately after the casting of the old skin the head and warts are honey-yellow, the latter with black points, and the skin is translucent, but dark in colour. The bristles are rather matted together, the tufts on top usually crossing each other, the under

surface is decidedly light. The hairs, which later became foxy-red, are then light-coloured.

This species was described as Nemeophila Selwynii, by the late Henry Edwards, in CAN. ENT., XVII., 65, but there can, I think, be no doubt that it is identical with that described in Proc. Ent. Soc., Phil., III., 113, by Dr. A. S. Packard, under the name of Plactarctia Scudderi, as follows :—

"♂.—Brownish-black. Sides of the prothorax, orange. Two whitish bands on the forewing; one lying just under the base of the median nervure, as long as the thorax; the other transverse running from just above the internal angle to the outer third of the costa. The middle of the patagia is whitish, and there are two curved narrow lines on each side of the meso-scutum. The tips of the palpi, and the ends of the femora above, and the tibiæ and tarsi are very pale yellowish-white, concolorous, with the bands on the thorax and primaries.

Secondaries entirely brownish-black, and concolorous with the forewings.

Length of body, .45; length of primaries, .65 inch."

Mr. Scudder's specimens were collected on the Saskatchewan River, but the best known locality is Nepigon, on the north shore of Lake Superior.

When I visited that place in 1890, July 9–11, in company with Mr. Fletcher, this species was just in season and fairly abundant, and I obtained over a dozen specimens in fine condition.

It is, however, a most difficult species to collect in good order, as the scales come off so easily that if two are in the cyanide bottle together, they damage each other immediately.

I do not think that the fact of so many of these larvæ passing through all their stages during the one season at all indicates a second brood under natural conditions, as their transformations were doubtless accelerated by being brought to a milder climate and kept in the house.

Last year Mr. Fletcher again visited Nepigon and secured eggs of this species and bred it to imago, and has informed me that while one specimen completed its transformations that season and gave the moth in the autumn, the rest of them hibernated when two-thirds grown on the surface of sod merely hidden beneath the leaves, close to the ground, but without any silken tent or cocoon. After awakening in the spring and before eating they measured exactly 5/8 of an inch (average).

Mr. Samuel Henshaw kindly compared for me a specimen from Nepigon with the specimens in the Cambridge Museum, and found that while

the specimens varied slightly in regard to the whitish transverse band on primaries, which is a variable feature, in other respects, both colorational and structural, as far as they could be compared they did not differ.

In extenuation of the insufficiency of my notes on the earlier stages, I would say that the larvæ were carried all across the continent and back again to Montreal.

A NEW SPECIES OF OLIGOLOPHUS.

BY NATHAN BANKS, SEA CLIFF, N. Y.

Very few Phalangids have been collected on our mountains, and so it is not surprising that a new species of a genus which in Europe lives in high altitudes should be found on Mt. Washington, New Hampshire. Early in September, 1893, Mrs. Annie T. Slosson kindly sent me several vials of arachnids from the White Mts., and among them a vial from Mt. Washington containing six specimens of a beautiful new species of Oligolophus. It differs from the other American species which have been referred to that genus in lacking spines to the femur of the palpus, thus resembling some alpine European forms.

Oligolophus montanus, nov. sp.

Length—♂, 4.5 mm.; ♀, 7. mm.; femur I., 2.5 mm.; femur II., 5. mm.; leg II., ♂, 30. mm.; ♀, 27. mm.

Cephalothorax without the median points, but with some small denticles in front of the eye-tubercle, a sublateral row each side, a few just behind the lateral pore, two or three on the margin a little further along, some at the posterior angle, one or two at the side of the eye-tubercle, a transverse row on an elevated ridge just behind the eye tubercle, and on each abdominal segment about nine denticles. All these denticles are black and arise from little white pits. The eye-tubercle is not large, canaliculate, and with two rows of about five denticles above. The palpi are clothed with short, stiff, black hairs, but no spines. The femur cylindrical, slightly curved, and enlarged at tip on the inner side; patella about half as long as femur, but broader and a little swollen at tip; tibia similar to patella, but a little longer; tarsus much more slender, a little curved, and about as long as tibia and patella together, claw smooth.

Legs short, the fourth pair about as long as the second, no false articulations in any of the tibiæ; metatarsus I. with two false articulations; the superior edges of coxæ I., II. and III. each bear a spine; the trochanters have some denticles on the anterior and posterior sides, the femora have about five rows of denticles; and there are two rows on

the under side of tibia I. in the ♂; the legs have many short hairs, and there are small spines at the ends of the joints.

The dorsum is dirty-white or gray, with a broad brown or blackish vase-mark. On the cephalothorax, the vase-mark covers nearly the whole surface; on the abdomen it grows narrower on the second and quite suddenly enlarging on the third segment; then gradually narrowing to the tip of the abdomen. The white or gray of the sides contains a few black spots. Venter dirty-white, with black spots; legs pale yellowish-brown; mandibles white, with a large brown spot above on the basal joint, and some smaller ones on the second joint. Femur of palpus almost wholly brown, some small spots on patella and tibia, tarsus pale.

The outline of the vase-mark from the cephalothorax to the enlargement on the abdomen is very sharp and distinct, and in the darker specimens it is bordered with white. Sometimes there is a paler stripe through the vase-mark.

Locality—Mt. Washington, New Hampshire; collected by Mrs. Annie T. Slosson.

NOTES ON A POLYMORPHIC PAPILIO.

BY WM. H. EDWARDS, COALBURGH, WEST VA.

For two or three years past Mr. David Bruce, in S. W. Colorado, has been taking *Papilio Bairdii* in company with a very different form, *P. oregonia*, as we have called it, and also with the form I described recently as *P. Hollandii*, which last is in general like *Bairdii*, but has the abdomen either with a broad stripe of yellow or almost completely yellow, instead of spotted yellow in rows, as in the *Asterias* group, and as in typical *Bairdii*. And from what Mr. Bruce has seen on the ground, he has become satisfied that all these three forms are but one species. It is a remarkable case of polymorphism, the more so that it is not confined to one sex only, and that the two main forms belong to what have been considered two different sub-groups, namely, *Bairdii* to the *Asterias* group, and this *Oregonia* to the *Zolicaon* and *Machaon* group. Of course, breeding is the final test in such a case. In 1892, Mr. Bruce obtained a large number of eggs from a ♀ of *Bairdii* confined over the food plant. This, by the way, is not one of the umbelliferæ, but of the compositæ, a strange plant for butterflies of either of these sub-groups to deposit their eggs on, *Artemisia dracunculoides*. And both these forms lay on it, passing by the umbelliferæ every time. Yet, the larvæ in confinement

have been reared on carrot, fennel and parsnip. The eggs spoken of hatched before Mr. Bruce left Colorado in September, and he brought the larvæ to his home at Brockport, N. Y., and enclosed them over a bed of growing carrots in his garden, under a wire gauze screen or box. In this way he got upwards of forty pupæ, but discovered soon that almost all had been stung by *Asterias* parasites. Out of the lot there were but three healthy pupæ, two of which produced *Bairdii* in the spring of 1893, and one a ♀ *Oregonia*, which Mr. Bruce sent me. But a few of the larvæ when half grown had been sent to Mrs. Peart, near Philadelphia, and from these she got four pupæ. These yielded in spring of 1893 one *Bairdii* and one very large and well-marked ♀ *Oregonia*, which also I now have. The other two pupæ are going over to 1894, as is often the case with the western Papilios, they running in the pupa stage for two years.

In 1893 Mr. Bruce was again upon the ground, and devoted his time largely to getting at the facts in this case. On the 23rd July he sent me two eggs of the *Oregonia*, as before, laid by a confined female. I sent one to Mrs. Peart, and she reared the larva and got a pupa 23rd August. Out of this, 8th September, came a ♂ *Bairdii*. The other egg produced a larva which died soon after third moult.

On 7th August, Mr. Bruce sent me twenty-four eggs of the *Oregonia*, obtained as before. The larvæ from these died off rapidly, and at all stages: seemed not to like their food. I treated them exactly as I have heretofore treated larvæ of Papilio, but I obtained only five pupæ. Some of the larvæ were certainly killed by the others, their bodies sucked dry, and this indicated, I think, a dislike to the food given. From the five pupæ up to date (21st September) have emerged four *Bairdii* imagos, 2 ♂, 2 ♀.

Thus imagos of *Bairdii* have come from eggs laid by the *Oregonia*, and in two instances *Oregonias* have come from eggs laid by *Bairdii*. As to *Hollandii* none of the *Bairdii* so far obtained are of that form, and its relationship to *Bairdii* is still but a matter of conjecture.

I am not satisfied that the form we are calling *Oregonia* is identical with the type form found in Oregon and Washington; am inclined to think it is not, and intended to propose the name *Brucei* for it. But, until more examples of the real *Oregonia* can be seen, I can come to no final conclusion.

I must not omit to say that at all stages the larvæ of these two forms are indistinguishable.

THE CLOVER-LEAF WEEVIL, PHYTONOMUS PUNCTATUS (FABR.) IN ITALY.

BY F. M. WEBSTER, WOOSTER, OHIO.

When Dr. J. A. Lintner prepared his first annual report in 1882, he, with the aid of Drs. Hagen and Le Conte, failed to discover any record of the clover-destroying habit of this species in Europe, and it was supposed at that time that this was a newly acquired habit, and occurring only in this country. Indeed, Dr. Le Conte failed to learn anything whatever in regard to the food habits of this species. As it has now entered into the Mississippi Valley and is rapidly pushing its way westward, it will be of interest to those who will have to deal with it in future to know that its taste for clover was not of American origin, but had been observed in its native home many years ago. It is a matter of surprise to me that nothing is said, by Italian observers, that gives the least hint of injury by the larvæ, which is, with us, by far its most destructive stage. Nor do I find that Sig. Piero Bargagli, from whose very useful work, *Rassegna Biologica di Rincofori Europei*, I have taken the following extract, anywhere mentions the larva of this species, which he considers under the name *Hypera punctata*, Fab.

Here in Ohio, I find that the larvæ prefer the white clover to the red, and some unsatisfactory observations of mine, made quite recently, make me feel rather suspicious that the food of the adult may include plants other than clover. At Chautauqua Lake some years ago, I observed the adults in quite numbers floating about, in the water, into which I supposed they had either dropped or been blown from the trees. But if this were so, what were they doing there?

(From Rassegna Biologica di Rincofori Europei, p. 97-8, 1883-87.)

During the years 1867–70, *Medicago sativa* and *Trifolium* were very much damaged in Lombardy and Bologna by this insect; and on the 4th of June, 1868, Mr. Antonio Villa, in *Relazione sugli insetti che devastano il Trifoglio, Milano, 1868*, and again in *Sull' insetto distruttore del Trifoglio, Milano, La Lombardia, 13 giugno, 1868*, directed the attention of the agriculturists of the district of Milan to the damage proven to have been done in the districts of Melegnano and Creme, attributing the extraordinary development of this species to the remarkable drouth, followed by excessive heat, causing the destruction of carnivorous insects which were hostile to this and other species. Various remedies were

employed for destroying the pests, among the most successful being the flooding of the meadows, rolling after the cutting of the clover, and, finally, collecting with small bags or nets.

In his second article, the eminent Mr. Villa stated the fact that, in the appendix to the work of Génè *(De quibusdam insectis Sardiniæ novis au. minime cognitis, Mem. R. Accad. Sc. Torino, Ser. I., Vol. 39, Ser. 11, Vol. I.)*, which had been prepared by Prof. Moretti, this species had been mentioned as among those having damaged clover. In pointing out how this insect had destroyed clover, Mr. Villa expressed the belief that an earlier attack had occurred, between the years 1834-35, in which the injuries done were similar in character to that of this species. The Station of Agricultural Entomology at Florence received notice, in June, 1879, that this insect had, in the Commune of Ferrara Erbagnana, destroyed a field of 5 ettari (about 11⅓ acres) in extent. (See *Relazione intorno ai lavori della Stazione Entomologica agraria di Firenze*, by *At Targioni-Tozzetti*, in *Annali di Agricoltura del Ministero di Agricoltura e Commercio, Roma, 1879.)*

In the neighbourhood of Florence, besides having been found in the clover in spring, it was, nevertheless, observed in the winter among moss at the base of trees, and, though hibernating, during warm, sunny days would come forth and bask in the sun.

CORRESPONDENCE.

CHALCID PARASITE.

Sir,—I would like to record the occurrence of the following Chalcid parasite :—

Bred from eggs of *Ianassa lignicolor*, Walker, on oak *(Quercus alba)* forty-five examples of

CHAETOSTICHA PRETIOSA, Riley.

1879, Riley, CAN. ENT., xi., 161.

minutissimum, Packard.

1883, Pack., Proc. Bost. Soc. Nat. Hist.., xxi., 37.

The insects varied in length from .35 mm. to .65 mm. In the males the abdomen was often black banded above or largely black. They appeared during the first part of August. Bred at Woods' Holl., Mass.

HARRISON G. DYAR.

CARTEROCEPHALUS PALÆMON.

Sir,—Mr. Thomas E. Bean, in an interesting article in the June number for this year, points out the identity of *Carterocephalus mandan*, Edw., and *C. palæmon*, Pall. I think he has well proven his position, and in the proper way, which is by a study of the geographical distribution, which will always show the intergrades between the two extremes of the series. The *Palæmon* of Middle Europe and the *Mandan* of the White Mountains of N. H. look different enough, but when the series is completed by material found between the two extremes there can no longer be a doubt as to their identity. In the species that fly from the Atlantic to the Pacific, and that also exist in Europe, it will be found that the Pacific Coast examples are far closer to the European ones than those individuals found on the Atlantic slope. (See Ent. News, Vol. I., p. 84.)

The fact that *Mandan* was identical with *Palæmon* was pointed out by Moschler in *Verhandlungen der Zoologisch-botanischen Gesellchaft in Wien*, Vol. 34, 1884, p. 283. My attention was called to this synonymy by Prof. E. Bergroth, of Tammerfors, Finland.

Dr. Henry Skinner, Philadelphia, Pa.

VARIETY OF PRIONOXYSTUS ROBINIÆ.

Sir,—In looking over my specimens of this common moth, I find a singular form that I never met with before, nor do I know of any description that has appeared in any entomological publication of a varied form of *P. (Cossus) robiniæ*, unless it may be Walker's *plagiatus*, of which I have not seen the original description. The example that I wish to make note of is a female, and differs from the regular form only in the following respects :—The whole of the sub-central inner space of the secondaries, "edging on the discoidal cell," is semi-transparent orange, similar to that which is so characteristic of the male, but it is not quite so intense in brightness of colour. The specimen is in fine condition, and is unique in appearance, when I compare it with the many examples that I have taken during the past season and previously ; hence I feel convinced that the form is remarkable enough to be burdened with a name of its own. I propose, therefore, to give it the name *P. robiniæ*, var. *quercus*, because the species is not restricted to the extermination of *Robinia pseudacacia* alone, but also does great damage to *Quercus alba, rubra and coccinea*. I have also found the pupa shells protruding from the trunks of *Fraxinus sambucifolia* in the same locality.

George A. Ehrmann, Pittsburgh, Pa.

OCNERIA DISPAR.

Sir,—I wish on behalf of the Entomological Society of Ontario to acknowledge the receipt of a box from Prof. C. H. Fernald, Ph. D., containing a complete life series of the Gypsy moth, *Ocneria dispar*, Linn., which the State of Massachusetts is making such a praiseworthy and heroic effort to exterminate. The exhibit is gotten up under the direction of Prof. Fernald, by order of the Gypsy Moth Committee, with a view to extending a knowledge of this most destructive insect. It consists of an egg mass as deposited by the female moth on the twig of a tree ; two eggs exposed to view ; six caterpillars, ranging from one that had just escaped from the egg to the full-grown larva, beautifully mounted ; a male and a female pupa ; a male moth with the wings spread, also one with the wings unspread ; a female moth with the wings spread, and one unspread. A most instructive and important contribution to the Society's collection. J. ALSTON MOFFAT, Curator.

NEW LOCALITIES FOR PAPILIO HOMERUS.

Sir,—It will doubtless interest your readers to know that, notwithstanding the fact that *Papilio homerus* has thus far only been accredited to a very limited habitat in the island of Jamaica, mainly along the valleys of the Sulphur and Devil's rivers, I have recently seen it in several localities in the *terra incognita* in the highland regions of the republics of Haïti and Santo Domingo. The mountain regions of the island known to Columbus as Espanola, or Hispanola as we have it, and which is now without a name as a whole—Haïti being the name of the French-negro republic to the west and Santo Domingo of the Spanish-negro republic to the east—are practically unknown to whites, many considerable areas never having been trodden by white men since the sanguinary expulsion of the French a century ago.

On a recent trip through this interior, in the interests of a newspaper syndicate, I visited a number of localities where there was growing the large creeper, apparently belonging or allied to the genus *Ipomœa*, which I had previously discovered was the food-plant of *Homerus*, and I was not, therefore, at all surprised to occasionally see examples of this most magnificent member of its genus sailing grandly overhead. I have no doubt that the patient collector who will go up into the Cibas range and carefully explore the deep ravines of the western slopes will be rewarded with a goodly number of this valuable species. *Homerus* is most difficult of

capture, its high flight and grandly rapid movements making it more of a problem in that respect than most of its moisture-seeking congeners. But the market value of the insect is such that, taken in connection with others to be captured in that region (*P. Machaonides* being among them), patience and hard living are sure to be well paid for. Should any collector feel like attempting such a trip into the heart of that Vaudoux-ridden region, I shall be glad to offer such suggestions as may occur to me as useful to him. I shall also be glad to hear from entomologists who are interested in the insect fauna of the Andean water-shed of the Amazon tributaries, in Bolivia, Peru and Brazil, a region which I propose visiting at an early date. Letters addressed as below will be promptly forwarded to me.

EUGENE MURRAY AARON,
Care of Geographical Magazine,
79 Nassau St., N. Y.

ARGYNNIS EGLEIS.

Sir,—With this I send you a piece of pine-cone with an egg of *Argynnis Egleis* on it. Yesterday, August 8th, being an unfavourable day for collecting *Parnassius Clodius*, I went in an aimless way to find a new collecting ground. When passing along the brow of a rocky slope, I came to a *Pinus Murrayana* tree (also called *P. Contorta*), and saw a female *A. Egleis* walking over sticks and burs that were lying on the ground beneath this tree. I halted for a moment to watch her, as she gave all the outward signs of a desire to oviposit; I had not to wait long, for she walked to a pine-cone and, seizing it with her legs, curled her body and fastened on an egg as far under the cone as she could reach. She then flew about two feet and oviposited twice in succession under a stick on a small stone, and on the piece of cone that I am sending you herewith. As I was standing almost directly over her, she flew to my left foot and oviposited several times under the shadow of my instep; she came and went several times to repeat her work. I lost a day's collecting, but felt amply repaid by the novelty of the knowledge I acquired. What the next female will teach me I cannot conjecture, but trust it will be no less surprising and interesting to the butterfly-loving world.

J. B. LEMBERT,
Summit of the Sierra Nevada, Cal.

[The egg arrived safely and duly hatched out; it will evidently hibernate without feeding.—Ed. C. E.]

PAPILIO CRESPHONTES.

I was much surprised at capturing a specimen of this Southern butterfly at Roach's Point, Lake Simcoe, on the 28th of August. The locality is about fifty miles north of Toronto, and is probably the most northern point that the butterfly has reached. The specimen was worn and somewhat damaged, but another nearly perfect one was seen and chased, but escaped capture. C. J. S. BETHUNE.

THE GOLDEN HEPIALUS.

Sir,—I have made one very interesting capture this season—*Hepialus auratus*, Grote. This rare moth was taken early in July, at Lonesome Lake, in the Franconia Mountains, about 3000 feet above the sea.

In this quiet, lonely spot Mr. William F. Bridge and Dr. W. C. Prime have a log cabin on the bank of the lake. It was in the twilight, after the sun had gone down, that my golden prize came fluttering by the open window of the cabin, and was soon in the poison bottle. It is a fine specimen, unbroken, but with some of the scales rubbed from its delicate wings. Mr. Grote described this moth in CAN. ENT., Vol. X., p. 18, from a specimen taken in the Adirondacks by Mr. W. W. Hill, in July, 1877. Ten years later Mr. E. P. Van Duzee, our well-known Hemipterist, took a specimen at Lancaster, N. Y., not far from Buffalo, and recorded the capture in Entomologist, Vol. XX., page 100. I have seen no record of any other capture, though it is of course possible that the moth is included in private collections of which I know nothing. At any rate it is among our very rarest moths, and I am glad and proud to include it in our Franconia list. ANNIE TRUMBULL SLOSSON.

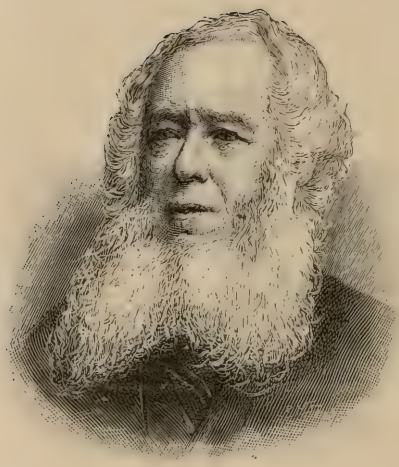
OMISSION.

On page 224 of our September issue, between the fourth and fifth lines from the bottom of the page, the following lines were unintentionally omitted:

First and third antennal joints subequal in length, some of the veins coloured with brown.....*levigata*, Loew.

The Annual Meeting of the Entomological Society of Ontario will be held in the rooms, Victoria Hall, London, on Wednesday, October 11th, at 3 o'clock p.m., and also at 8 p.m.

Mailed October 5th.



THE LATE PROFESSOR WESTWOOD.

N.Y. ACADEMY OF MEDICINE LIBRARY

The Canadian Entomologist.

VOL. XXV. LONDON, NOVEMBER, 1893. No. 11.

THE LATE PROFESSOR WESTWOOD.

We are much pleased to be able to give in this issue a likeness of the very eminent entomologist, Professor Westwood, for which we are indebted to the kindness of the publishers of the *Illustrated London News*.

John Obadiah Westwood, M.A., F.L.S., etc., was born at Sheffield, England, on the 22nd of December, 1805, and died shortly after completing his 87th year, on the 2nd of January last. His father was a die-sinker at Sheffield, but afterwards removed to Lichfield. When nearly 16 years of age, he went to London to be articled to a solicitor, and though he devoted his attention more to the study of natural history than of law, he was admitted as a solicitor and became partner in a firm. Having some private means, which he augmented by writing and drawing, he was enabled to neglect his profession and give himself up almost entirely to entomology and archæology.

To quote Mr. McLachlan's obituary notice in *The Entomologists' Monthly Magazine*, "it was probably by his rare, artistic talent that he acquired much of his justly great reputation. His drawings of insects were masterpieces of accuracy without the slightest attempt at effect, and rapidly executed; few have equalled him in correct delineation. There certainly never has been an entomologist who left behind him so much evidence, in practical work, of his ability to delineate insects, even to the most minute dissections. But Westwood was much more than an artist in entomology. There probably never has existed, and, in the present state of the science, there never can again exist, one who had so much general knowledge, both from personal investigation and a study of the works of others; one who was less of a specialist in the modern acceptation of the term. It is true he was a specialist, but it was in the way of taking up small groups in all orders, and working them out thoroughly, his artistic talent giving merit and force to those small monographs. Under a somewhat brusque manner was concealed a hearty sympathy for all real workers, and, if he offended, it was commonly in the way of pointing out to would-be introducers, etc., of supposed novelties that some one or other had already made similar observations, his vast mem-

ory rendering him very dangerous in this respect. In society there could be no more genial companion, full of anecdote, but with small appreciation of humour. At home there could be no more generous host."

Professor Westwood was best known on this side of the Atlantic from his admirable work—"An Introduction to the Modern Classification of Insects," which was published in two volumes in 1839 and 1840. Every entomologist, worthy of the name, has no doubt made a study of this book, which still continues to be the best text-book on the subject in the English language. His sumptuous works on exotic insects, such as his "Arcana Entomologica," "Oriental Entomology," and his edition of Drury's "Exotic Insects," are also widely known, but his numerous contributions to various Natural History periodicals, a mere list of which would fill a volume, are not so familiar to our students. He was a most industrious and prolific writer, and made investigations in almost every family of insects in all the orders. His work is always characterized by its marvellous accuracy and patient elaboration of details both of structure and habit. Very rarely was he ever known to make a mistake.

He was actively associated with the Entomological Society of London from its foundation in 1833, and was for many years its Secretary. Subsequently he was elected President at three periods of two years each, and was made Honorary Life President when the Society celebrated its jubilee in 1883. He was a Fellow of the Linnæan Society from 1827, and an Honorary or Corresponding Member of Scientific Societies all over the world.

In 1858 the Rev. F. W. Hope, a wealthy amateur, who had been for years a warm friend and patron of Westwood, and had purchased his collections, gave them and his own to the University of Oxford, and founded a Professorship of Invertebrate Zoology, which bears his name. Westwood was appointed the first Hope Professor, and, in consequence, removed to Oxford, where he was a conspicuous figure in the University for five and thirty years.

Besides his Entomological work, he was a distinguished Archæologist and was widely known amongst those of kindred tastes by his investigations of the "Palæographia Sacra Pictoria," his "Lapidarium Walliæ," and "Fac Similes of the Miniatures and Ornaments of Anglo-Saxon and Irish Manuscripts." He formed a remarkable collection of carved ivories and inscribed stones, as well as of insects. In all respects he was a remarkable man, and accomplished, by dint of steady industry and enthusiastic perseverance during a long life, an amount of valuable scientific work that has rarely, if ever, been excelled.

THE FIFTH ANNUAL MEETING OF THE ASSOCIATION OF ECONOMIC ENTOMOLOGISTS.

ABSTRACTED FROM THE OFFICIAL MINUTES BY L. O. HOWARD, FOR THE CANADIAN ENTOMOLOGIST.

The fifth annual meeting of the Association of Economic Entomologists was held at Madison, Wisconsin, in the Science Hall of the University of Wisconsin, on August 14, 15 and 16, 1893.

Sixteen members were present, as follows :—President S. A. Forbes, Second Vice-President J. B. Smith, Secretary H. Garman, J. M. Aldrich, G. F. Atkinson, G. C. Davis, C. P. Gillette, A. D. Hopkins, L. O. Howard, M. E. Murtfeldt, H. Osborn, C. V. Riley, P. H. Rolfs, H E. Summers, F. M. Webster and H. E. Weed. A number of visitors and members of other scientific associations were present during the sessions, making rather a large attendance.

The following papers were presented, among them several from foreign entomologists, and the discussions were of the greatest interest. I shall briefly mention the papers in the order of their presentation :—

The annual address of President S. A. Forbes reviewed the 115 economic articles containing new matter published by members of the Association since the last meeting. These articles he grouped by subjects and by nature of outcome, thus giving an admirable idea of the work of the year in shape for the drawing of conclusions. He called attention to a narrowness of view and consequent inadequacy in the treatment of general questions, due to the want of comprehensive organization and systematic co-operation. In his opinion the methods of publication and enforcement of results now in general use fall far short of their final end. As a result the farmer has not responded to the suggestions of the investigating entomologist as might be anticipated. He suggested that more attention might be paid to describing the effects of the insect work than to the insects themselves, subordinating the account of the insects. He insisted that instead of making an entomologist of the farmer we should make a farmer of the entomologist. He suggested distinguishing between the temporary and permanent presentation of facts in economic publications, advising the preparation of special economic summaries or monographs of all insect injuries to each of the various crops, and printing and distributing these summaries in great numbers. Co-operation in this particular line was urged. Addresses to Farmers' Institutes should be accompanied by a printed résumé to be distributed among those present.

He spoke of the fact that the boundaries of the States represented by official entomologists are artificial, and that in consequence matters of distribution and other broad questions are seldom touched. This fact and the danger of unnecessary duplication of work, and other reasons, called for organziation, and this organization should be of flexible form, leaving each individual free to meet the special requirements of his individual work, and at the same time helping to concentrate the surplus effort which should be contributed to the accomplishment of common ends. He suggested that a committee on co-operation propose a list of subjects in which co-operative effort is desirable. These subjects should then be attacked by volunteers, who should report to the committee. In this way he thought that the benefits of organization might be obtained without the surrender of individual initiative.

The address was discussed by Messrs. Osborn, Smith and Webster. Messrs. Osborn, Smith and Garman were appointed a committee of three to consider the recommendations contained in the address.

Messrs. Edward H. Thompson, of Tasmania, R. Allan Wight, of New Zealand, and G. C. Davis, of Agricultural College, Michigan, were elected to membership.

Mr. Osborn presented a paper entitled "Methods of Treating Insects affecting Grasses and Forage Plants." In this paper he considered the insects affecting these crops by groups arranged according to the method of treatment, discussing particularly climatic conditions, natural enemies, agricultural methods and the direct method. He presented a most interesting table of insects, showing in horizontal columns the food-plants, number of annual broods, and the condition in which the species is to be found during any month in the year. The paper was discussed by Mr. Hopkins.

The next paper, by Mr. Howard, was entitled "Notes on Methods of studying Life-histories of Injurious Insects," in which he described the vivarium methods in use in the Division of Entomology of the U. S. Department of Agriculture, but insisted that outdoor work is preferable where feasible. The question of methods of ventilation of the insectary and kindred topics were discussed by Messrs. Forbes, Garman and Howard. Mr. Forbes thought that indoor work on life-histories should always be verified by outdoor observation.

Under the caption "Another Mosquito Experiment," Mr. Howard detailed his experience with the use of kerosene on the surface of mosquito

breeding pools since his announcement of his first experiment a year ago. Mr. Smith in discussion mentioned two cases where this remedy had been applied effectually on Long Island. Mr. Webster thought that further experimentation was needed on the line as to the office of mosquito larvæ in destroying organic matter in water, which might otherwise become offensive.

The Secretary read a paper by Dr. Ritsema Bos, on "*Phytomyza affinis*, Fall., as a Cause of Decay in Clematis." The larvæ of this little fly he had found to produce a disease spot on the stem a little above the level of the ground, causing the subsequent drying up of the stem. He found two generations of the fly each year, and advised the cutting off and burning of decaying stalks in early summer. Messrs. Hopkins and Garman reported similar appearances in potato stalks and the terminal twigs of apple, which were probably due to a closely allied insect.

Mr. Smith read a paper on "Farm Practice and Fertilizers as Insecticides." The nature of the paper is well indicated by its title. A number of instances were pointed out where variation in farm practice produces excellent insecticide results, and others in which commercial or artificial fertilizers destroy subterranean insects as well as invigorate the crop. The intelligent use of fertilizers combined with other intelligent farm practice, in his opinion will in the future prove the main reliance of the farmer. He showed, however, that the phosphates form a group of fertilizers which have no insecticide value.

Messrs. Garman and Webster discussed this paper, and agreed that the main beneficial results in the use of artificial fertilizers are due to the increased vigour of the plant, enabling it to better resist the attacks of insects. They doubted the primary insecticide effect of these compounds.

The above papers were all read at the first session of the Association, on the afternoon of August 14. At the second session, on the morning of the 15th, letters were read from certain foreign entomologists regretting their inability to attend the meeting.

Mr. Garman presented a paper on the "Preservation of Larvæ for Study." He drops the larva into water heated to the boiling point, leaving it for 15 seconds. Then, when the body wall is somewhat rigid, he takes it up with the forceps, and with a fine sharp scissors cuts a slit along the underside of the body, dropping it into the water again for a few seconds longer. It is then transferred to 50% alcohol, and in 12 hours to 70%, and in 12 hours afterwards to 95%, for permanent preservation.

Shape, colours and structure are well preserved in this way. As a substitute for alcohol he recommends:—boiling water, 250 cc.,; common salt, 3 teaspoonfuls; powdered alum, one teaspoonful; pure carbolic acid, 5 drops; filter.

Mr. Forbes spoke of the preservation of fruits at the World's Fair, and suggested that plants injured by insects may be preserved in the same way. Mr. Summers had found nothing which would satisfactorily preserve fruits. Mr. Osborn thought that aqueous preparations would freeze. Mr. Smith has employed with success methods similar to those of Mr. Garman.

A paper by Mr. Cockerell, entitled "The Distribution of Coccidæ," was read by the Secretary. He compared the Coccidæ of the West India Islands with the adjoining mainland, and spoke of the further distribution of a number of species which he had studied in Jamaica. Of 18 species found on that Island all but 3 are known elsewhere, and 11 have been detected outside of neotropical regions.

Mr. Hopkins presented his views on "Note and Record-keeping for the Economic Entomologist." He described the system which he has worked out and adopted, and which he has proved to be well adapted to the requirements of his work. The system consists of an accession catalogue and a species catalogue. Specimens of his cards or note pads were exhibited, and Messrs. Smith, Osborn and Webster discussed the paper, Mr. Webster giving in full his own system of note-keeping. Messrs. Smith and Osborn objected to the use of check-list numbers alone for species as adopted by Mr. Hopkins.

Mr. Garman's paper on "Illustrations for the Economic Entomologist" was next presented. He considers that the object of illustrations is to convey information and to save time in description, finish and technique, being, therefore, matters of secondary importance. The different methods of reproducing drawings was very carefully and fully discussed. Etching was considered in general impracticable, as calling for a special method of drawing. Lithography was considered too expensive, and wood engraving is subject to liability of the engraver to misinterpret certain details of the drawing; but at the same time it was admitted that of our published figures wood-cuts are the best. In spite of its disadvantages, it is the most satisfactory method, although somewhat expensive. Cheap process figures are excellent for newspaper and other transient literature. Their right in permanent literature, and especially in scientific

writings, is questionable at the present time. No cheap process known to the writer gives good results in shaded figures. These figures give promise of something better in the near future. If it were not, however, for this hopeful outlook, it would be well to return to wood-engraving. Entomologists were urged to make their drawings with extreme care and to adapt them to a particular process, and not to rest satisfied with inferior reproduction. The paper was discussed by Messrs. Osborn, Weed, Smith, Hopkins, Gillette, Forbes and Howard.

Mr. Gillette read a paper on "The Arsenites and Arsenical Mixtures as Insecticides." The article comprised a general summary, historical and critical, of the use of these substances in their different combinations. The paper was discussed briefly by Messrs. Beal, Wood and Galloway, all of whom were present at the meeting, although not members of the Association.

Upon invitation, Mr. B. T. Galloway, Chief of the Division of Vegetable Pathology of the U. S. Department of Agriculture, gave a short account of some recent work done in his division upon a bacterial disease of melons and other cucurbits, which had been found to be largely disseminated by the agency of insects, particularly of *Diabrotica vittata* and *D. 12-punctata*. Messrs. Webster, Smith and Garman had seen the same disease in their respective localities.

At the third session, held in the afternoon of August 15, an amendment to the constitution was adopted levying annual dues of fifty cents upon each member of the Association, and a resolution was passed authorizing the publication of the whole proceedings in *Insect Life*, and the sending of an abstract to the CANADIAN ENTOMOLOGIST.

Messrs. Osborn, Webster and Weed were appointed a committee on nomination of officers.

Mr. Hopkins read a paper on "Destructive Scolytidæ and Their Imported Enemy." He gave a summary of the damage done by bark-boring bettles in West Virginia and other portions of the country, and his investigation of this damage in the former State. He further described his trip to Germany during 1892, and the collection of about 1,000 specimens of *Clerus formicarius*, which he brought alive to this country. He described the placing of the insects and their over-wintering. Up to the time of presentation of the paper no means of ascertaining to what extent the insects have multiplied had been found.

Mr. Riley presented a communication entitled "Parasitic and Predaceous Insects in Applied Entomology." He indicated the utility and importance of the subject, and pointed out the dangers and disadvantages resulting from false and exaggerated opinions. He gave an extended summary of the methods in which insect enemies of insects may be utilized; and followed with a chronological and detailed account of the suggestions and attempts, successful and otherwise, to introduce parasites and predaceous insects into one portion of a country from another, or into one country from another. He showed that the general laws governing the interactions of organisms, however, are such that we can in only very exceptional cases derive benefit by interference with them. The indigenous enemies of an indigenous insect are better qualified to keep it in check than an imported species. Where the injurious insect is a foreigner, however, and has been brought over without the enemy which keeps it in check in its native home, then the introduction of these enemies will be advisable. Thus the introduction of the European parasites of the Gypsy Moth would be advisable. Such an introduction could do no possible harm, and may be productive of lasting good.

Mr. Smith followed with a paper in the same line, called "The Economic Value of Parasites and Predaceous Insects." The writer, while realizing the importance of parasites in maintaining the balance of nature, felt that their economic value has been grossly over-estimated. He showed that parasites simply reduce excess, but only after damage to crops has been done. The practical utilization of parasites is more or less a myth, except in very exceptional cases like that of Vedalia and Icerya. An injurious insect which under natural conditions is abundant each year, must be dealt with without regard to parasites or natural enemies.

Mr. Webster read a paper on "Insect Foes of American Cereal Grains, with Measures for Their Prevention or Destruction." In the main the author insisted upon the importance of proper farm practice. He knows of no better insecticide than good farming. Four-fifths of the injury done by the Hessian Fly may be prevented by a better system of agriculture. The same point was elaborated with regard to other grain insects, and the serious ravages of a number of the most important pests were pointed out, and general consideration of the proposed direct remedies was entered into. In the opinion of Mr. Webster, the field of the economic entomologist is poorly defined at present,

and too much is expected from him. The science of applied agriculture should relieve him of some of his duties. This paper was discussed in some of its details by Messrs. Riley, Forbes and Howard.

The fourth session was held on the morning of August 16. The Committee on the President's Address reported in favor of the adoption of his recommendations and the appointment of a standing committee to present a detailed plan for co-operative work among members, and to make recommendations concerning legislation. The report was adopted, and Messrs. Osborn, Smith and Garman were appointed as a committee.

Mr. Forbes read a paper by H. Du Buysson upon "Fumigation with Carbon Bisulphide for the complete and rapid destruction of Insects which attack Herbaria, Furrieries and Woollen Stuffs." In this article a very ingenious and interesting water joint for the box used for fumigating purposes was described, and the best method of employing the box for the different classes of objects mentioned in the title was given. Mr. Atkinson stated in discussion that he had used a very similar box in fumigating objects infested by insects. Mr. Garman stated that at Cambridge a zinc-lined case was constantly used for disinfecting bird and mammal skins. Mr. Riley had used the bisulphide in the insect collections of the National Museum. Mr. Smith had used it against ants and Mr. Garman against the melon louse. The latter gentleman rolls the melon vines up into a heap, inverts a tub over them, and places a little bisulphide in a saucer under the edge of the tub.

Mr. Atkinson read a paper by Dr. J. Ritsema Bos, on "Aphelenchus olesistus, nov. sp., a nematoid worm, causing Leaf-sickness in Begonia and Asplenium." He referred to a note by Mr. Atkinson, read at the preceding meeting of the Association, in which an Anguillulid is described as affecting leaves of Chrysanthemum and Coleus, making no swelling or deformity, but causing brown patches on the leaves. The author having studied and described *Aphelenchus olesistus* in Europe, where it causes almost precisely the same trouble with Begonia and Asplenium, he is inclined to think that the species previously mentioned by Mr. Atkinson is identical. In the discussion, Mr. Atkinson stated that while there were characters in the form studied by him which seemed to place it in the genus Tylenchus, he thought that careful comparison of types might show the two to be identical.

Mr. Osborn presented a paper on "Methods of Attacking Parasites of Domestic Animals." The preventive measures consisted in the ex-

amination of the introduced animals and the application of the usual direct methods. A critical summary of all the proposed remedies followed. The paper was briefly discussed by Messrs. Gillette, Aldrich, Riley, Hopkins, Weed and Howard. Mr. Riley, in speaking of the alleged poor success on the part of certain individuals in the use of kerosene emulsion, said that the difficulties of making a good emulsion and of getting intelligent farmers to use it safely are unnecessarily magnified. He further stated that he could not accept the opinion that in the case of two given remedies the poorer one was to be recommended, because the better one required a little more care and intelligence in making and using.

In the paper by Mr. Weed on "Remedies for Insects Injurious to Cotton," the author discussed the application of Paris green against the Cotton Worm by means of bags at the extremities of a long pole, carrried by a "darkey" on a mule, going at a brisk trot between the rows. This he considered to be the most simple apparatus which he had seen for distributing dry poisons. For the Boll Worm, he considered the best application to be the planting of a row of corn about every tenth row through the cotton field at such a time that it will mature early in September.

In Miss Murtfeldt's paper on "The Cheese or Meat Skipper," which followed, the author drew an interesting parallel between the tendency of the farmer to exaggerate his losses from insect damage and that of the commercial man to underestimate this damage and to conceal it because of its possible influence upon his trade. She reviewed the literature of *Piophila casei*, and said that accounts of its life-history are not readily accessible in this country. She gave a popular synopsis of her personal observations upon the species, particularly as injuring hams. The larvæ feed principally around the bony ends among the tendons, and in the fat and in the oil-saturated folds of the canvas wrappers. Hibernation is in the adult stage. About thirty eggs are laid by each female. The larval stage lasts from seven to eight days, and the puparium state about ten days. There is no definite succession of broods, and the insect may be found in all stages from May until November. The flies are readily killed by the fumes of burning sulphur or pyrethrum powder. The covering of windows with a light domestic is advised, as the flies will get through ordinary wire screens. The paper was briefly discussed by Messrs. Aldrich and Riley.

Mr. Coquillett's paper, entitled "Hydrocyanic Acid Gas as an Insecticide," was read by the Secretary. The paper consisted of an historical review of the use of this gas in California, together with an account of the methods in use at the present time, and some slight consideration of its effect upon different insects. The cost of fumigating a tree varies from five cents to one dollar, and even at the latter rate figures were produced to show that it is economical.

A paper by Dr. J. A. Lintner, on "Arsenical Spraying of Fruit Trees while in Blossom," was read by Mr. Smith. The author reviewed the experiments by Mr. Webster, and the statements by Mr. Cook, and suggested that the whole question can be settled by confining a hive of healthy bees to blossoms sprayed with Paris green, and afterward testing the stomach for arsenic. The law against spraying while trees are in blossom, as passed by the Legislature of Ontario, was reviewed, and a long list of the insects which might be satisfactorily treated by arsenical spraying at the time of blossoming was given. Further experimentation was strenuously urged. Some discussion followed by Messrs. Webster and Garman.

The fifth session was held in the afternoon of the 16th August. The following officers for the ensuing year were elected :—

President, L. O. Howard.
First Vice-President, J. B. Smith.
Second Vice-President, F. L. Harvey.
Secretary, C. P. Gillette.

Three papers on the insects of the season in their respective localities were read by Messrs. Webster, Smith and Osborn, and were discussed by Mr. Riley.

A paper by Mr. R. Allan Wight, of Auckland, New Zealand, was read by Mr. Osborn; it was entitled "*Icerya purchasi* and *Vedalia cardinalis* in New Zealand." The paper consisted of a condensed summary of the history of these two insects in New Zealand and their inter-relations. This paper was discussed by Mr. Riley.

Mr. Smith then read a paper by Mr. F. W. Urich, of Port of Spain, Trinidad, consisting of "Notes on Some Insect Pests of Trinidad, B. W. I." The paper was an interesting summary of Mr. Urich's observations on the injurious insects of that Island, and referred mainly to Coccidæ and their natural enemies, a leaf-cutting ant (*Atta sexdens*), a longicorn beetle (*Steirastoma depressum*) and certain Acridiidæ. Especial mention of a little Cyprinodont fish was made. This fish is found commonly all through Trinidad, and feeds upon mosquito larvæ. Mr. Urich suggested its introduction into America for use in tanks and ponds.

The Secretary then read a "Note on Slip-records," by Mr. Cockerell. The author suggested the use of a uniform system of notes upon slips of a uniform size by all entomologists, and submitted samples. The question was discussed by Messrs. Hopkins, Summers and Riley.

The Association then adjourned subject to the call of the Executive Committee.

LIST OF COLEOPTERA TAKEN AT SPARROW LAKE, ONT.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Sparrow Lake is an expansion of the Severn river, situate a little south of lat. 45° and east of 80° longitude. Geologically, this part of Ontario belongs to the Laurentian formation, and that of a very rugged type. The southwest side of the lake, where these coleoptera were taken, save in a few spots among the rocks, is wholly uncultivated and uncultivable to the Georgian Bay, a distance of from 20 to 30 miles. Till recently it sustained an immense forest growth, mostly pine, which has now disappeared, and has been succeeded by a dense and almost impenetrable jungle of briars and bushes of many deciduous species.

So far as coleoptera are concerned, a large majority of the species inhabiting this district must be considered autocthonous, and it is not difficult to determine approximatively such as are following the little spots of cultivation that are being interjected. The collecting was done from July 20th to August 15th. That the list is no longer is not altogether the fault of the collector; in fact, in addition to the paucity of species, while some are in great abundance, the majority are each represented by from one to three examples only.

As this part of Ontario is in a comparatively primitive condition, and no record of the coleoptera inhabiting it has been observed, the subjoined list may be of some interest:—

Cicindela repanda, *Dej.*
var. 12-guttata, *Dej.*
Cychrus Lecontei, *Dej.*
Carabus sylvosus, *Say.*
Calosoma scrutator, *Fab.*
Wilcoxi, *Lec.*
calidum, *Fab.*
Elaphrus ruscarius, *Say.*
Loricera cærulescens, *Linn.*
Nebria pallipes, *Say.*
Scarites subterraneus, *Fab.*
Dyschirius nigripes, *Lec.*
Bembidium patruele, *Dej.*
versicolor, *Lec.*
Sp. undetermined.
Pterostichus corvinus, *Dej.*
erythropus, *Dej.*
Amara exarata, *Dej.*
pallipes, *Kirby.*
rubrica, *Hald.*
Calathus gregarius, *Say.*
Platynus sinuatus, *Dej.*
extensicollis, *Say.*
atratus, *Lec.*
melanarius, *Dej.*
corvus, *Lec.*
placidus, *Say.*
Bogemanni. *Gyll.*
ruficornis, *Lec.*
Galerita janus, *Fab.*

Tachys nanus, *Gyll.*
flavicauda, *Say.*
Patrobus longicornis, *Say.*
Pterostichus honestus, *Say.*
coracinus, *Newm.*
stygicus, *Say.*
lucublandus, *Say.*
caudicalis, *Say.*
luctuosus, *Dej.*
Agonoderus pallipes, *Fab.*
Harpalus erraticus, *Say.*
viridiæneus, *Beauv.*
Sp. undetermined.
pennsylvanicus, *De G.*
fallax, *Lec.*
pleuriticus, *Kirby.*
viduus, *Lec.*
Stenolophus plebeius, *Dej.*
conjunctus, *Say.*
Anisodactylus Harrisii, *Lec.*
interstitialis, *Say.*
Ilybius biguttalus, *Germ.*
Hydaticus stagnalis, *Fab.*
Dytiscus fasciventris, *Say.*
Gyrinus canadensis, *Reg.* ?
analis, *Say.*
Berosus striatus, *Say.*
Philydrus perplexus, *Lec.*
Hydrobius fuscipes, *Linn.*
Creniphilus sub-cupreus, *Say.*
Cercyon pygmæum, *Ill.*
Necrophorus vespilloides, *Hbst.*
Silpha Americana, *Linn.*
Pæderus littorarius, *Grav.*
Sunius longiusculus, *Mann.*
Tachinus repandus, *Horn.*
fimbriatus, *Grav.*
Erchomus ventriculus, *Say.*
Lebia viridis, *Say.*
Metabletus americanus, *Dej.*
Cymindis pilosa, *Say.*
Brachynus cyanipennis, *Say.*
Chlænius sericeus, *Forst.*
pennsylvanicus, *Say.*
Anomoglossus emarginatus, *Say.*
Brachylobus lithophilus, *Say.*
Liodes discolor, *Mels.*
Homalota trimaculata, *Er.*
Bolitochara picta, *Fauv.*
Aleochara bimaculata, *Grav.*
graciliformis, *Fauv.*
Gyrophæna vinula, *Er.*
Quedius fulgidus, *Fab.*
lævigatus, *Gyll.*
Listotrophus cingulatus, *Grav.*
Creophilus maxillosus, *Linn.*
Staphylinus violaceus, *Grav.*
Philonthus politus, *Linn.*
longicornis, *Steph.*
micans, *Grav.*
cyanipennis, *Fab.*
sordidus, *Grav.*
Sp. undetermined.
Xantholinus obsidianus, *Mels.*
emmesus, *Grav.*
obscurus, *Er.*
N. S. (found here).
Baptolinus longiceps, *Fauv.*
Stenus—3 sp.
Lathrobium punctulatum, *Lec.*
bicolor, *Lec.*
Stilicus, sp.
Histerdepurator, *Say.*
sedecimstriatus, *Say.*
carolinus, *Payk.*
Lecontei, *Mars.*

Conosoma pubescens, *Payk.*
Boletobius cincticollis, *Say.*
Olisthærus substriatus, *Gyll.*
Oxyporus femoralis, *Grav.*
rufipennis, *Lec.*
Oxytelus sculptus, *Grav.*
pennsylvanicus, *Er.*
insignitus, *Grav.*
Trogophlœus 4-punctatus, *Say.*
Scaphisoma convexum, *Say.*
Hippodamia 13-punctata, *Linn.*
Coccinella trifasciata, *Linn.*
Chilocorus bivulnerus, *Muls.*
Psyllobora 20-maculata, *Say.*
Hyperaspis signata, *Oliv.*
Scymnus lacustris, *Lec.*
Endomychus biguttatus, *Say.*
Tritoma thoracica, *Say.*
Silvanus bidentatus, *Fab.*
Læmophlæus fasciatus, *Mels.*
Calopteron terminale, *Say.*
Calochromus perfaceta, *Say.*
Ellychnia corusca, *Linn.*
Telephorus lineola, *Fab.*
scitulus, *Say.*
Collops tricolor, *Say.*
Trichodes Nuttalli, *Kirby.*
Hydnocera pallipennis, *Say.*
longicollis, *Zieg.*
Cis fuscipes, *Mellie.*
Canthon lævis, *Drury.*
Onthophagus Hecate, *Panz.*
Dialytes striatulus, *Say.*
Ulkei, *Horn.*
Aphodius fossor, *Linn.*
fimetarius, *Linn.*
ruricola, *Mels.*
leopardus, *Horn.*
Epuræa Erichsonii, *Reit.*
Sp.
Ips fasciatus, *Oliv.*
Stephostethus liratus, *Lec.*
Corticaria pusilla, *Mann.*
pumila. *Lec.*
Tenebrioides corticalis, *Mels.*
Cyphon obscurus, *Guer.*
Deltometopus amœnicornis, *Say.*
Dromaeolus Harringtoni, *Horn.*
Alaus myops, *Fab.*
Agriotes fucosus, *Lec.*
Sp.
Melanotus castanipes, *Payk.*
fissilis, *Say.*
Corymbites medianus, *Germ.*
propola, *Lec.*
Dicerca tuberculata, *Chev.*
Sp. undetermined.
Buprestis rusticorum, *Kirby.*
fasciata, *Fab.*
Agrilus ruficollis, *Fab.*
Valgus canaliculatus, *Fab.*
Hylotrupes bajulus, *Linn.*
ligneus, *Fab.*
Calloides nobilis, *Say.*
Arhopalus fulminans, *Fab.*
Xylotrechus sagittatus, *Germ.*
Clytanthus ruricola, *Oliv.*
Euderces picipes, *Fab.*
Desmocerus palliatus, *Forst.*
Centrodera decolorata, *Harr.*
Gaurotes cyanipennis, *Say.*
Typocerus sparsus, *Lec.*
velutinus, *Oliv.*
Leptura nitens, *Forst.*
canadensis, *Oliv.*
vagans (var. brevis, *Kirby*)

Aphodius lentus, *Horn.*
Geotrupes splendidus, *Fab.*
Anomala lucicola, *Fab.*
Ligyrus relictus, *Say.*
Euphoria fulgida, *Fab.*
Osmoderma scabra, *Beauv.*
Trichius affinis, *Gory.*
Pachybrachys femoratus, *Oliv.*
" hepaticus, *Mels.*
Monachus saponatus, *Fab.*
Diachus auratus, *Fab.*
Adoxus obscurus (var. vitis, *Fab.*)
Xanthonia 10-notata, *Say.*
Typophorus canellus (var. aterrimus.)
Chrysochus auratus, *Fab.*
Rhabdopterus picipes, *Oliv.*
Doryphora 10 lineata, *Say.*
Chrysomela bigsbyana, *Kirby.*
Galerucella nymphææ, *Linn.*
Diabrotica 12-punctata, *Fab.*
" vittata, *Fab.*
Phyllobrotica decorata, *Say.*
Cerotoma 3-furcata, *Forst.*
Dysonycha pennsylvanica, *Illig.*
Haltica ignita, *Illig.*
Crepidodera helxines, *Linn.*
Epitrix cucumeris, *Harris.*
Systena hudsonias, *Forst.*
" marginalis, *Illig.*
Nyctobates pennsylvanica, *De G.*
Xylopinus saperdioides, *Oliv.*
Monohammus confusor, *Kirby.*
Urographis fasciatus, *De G.*
Saperda vestita, *Say.*
" 3-dentata, *Oliv.*
Amphionycha flammata, *Newm.*
Donacia palmata, *Oliv.*
" piscatrix, *Lac.*
" proxima, *Kirby.*
" 2 sp. not determined.
* Tenebrio molitor, *Linn.*
Blapstinus interruptus, *Say.*
Uloma impressa, *Mels.*
Diaperis hydni, *Fab.*
Boletotherus bifurcus, *Fab.*
Cistela sericea, *Say.*
Penthe pimelia, *Fab.*
Eustrophus confinis, *Lec.*
Canifa pallipes, *Mels.*
Stenotrachelus arctatus, *Say.*
Anaspis rufa, *Say.*
Mordella melæna, *Germ.*
" marginata, *Mels.*
Xylophilus tuberculifer, (*infra.*)
Epicauta pennsylvanica, *De G.*
Attelabus bipustulatus, *Fab.*
Ithycerus noveboracensis, *Forst.*
Lissorhoptrus simplex, *Say.*
Magdalis armicollis, *Say.*
Orchestes niger, *Horn.*
Gymnetron tetrum, *Fab.*
Balaninus uniformis, *Lec.*
Eupsalis minuta, *Drury.*
Dryocœtes, n. sp.

Loricera cærulescens, *Linn.* (*pilicornis*, Fab). A few examples of this interesting beetle were taken on the margin of the lake under pieces of drift partly immersed in the water. It seemingly avoids muddy places.

Chlænius pennsylvanicus, *Say.* A variety, or rather individuals of this species, occurred with the margins of the elytra bordered with rufous like

in *circumcinctus*, but which lack the smooth facets of the thorax of that species. This is the *circumcinctus* seen in some Canadian lists, but the true *circumcinctus* does not inhabit Canada.

Aleochara graciliformis, *Fauv.* This species, though named many years ago by Mr. A. Fauvel (as I am informed), has never found a place in our catalogue. It has been in my collection from various places in Ontario for several years. It is a very pretty species, black, thorax without impression, legs and elytra bright rufous ; an occasional individual has the sides of the elytra narrowly black, and while such are more finely punctate and have darker legs they are not considered distinct.

Philonthus politus, *Linn.* (*aeneus* Rossi). This species was correctly determined by both Kirby and Macklin. It is nearly cosmopolite. The *politus* of our catalogue must be changed to *fuscipennis*, Mann. These are the latest decrees of synonymists.

Creophilus maxillosus, *Linn.* Systematists now recognize but one species of *creophilus* as inhabiting North and South America, Asia, Northern Africa and Europe. It exists in about ten named varieties or variations, *villosus*, Grav., and *bicinctus*, Mann., being the American forms.

Bolitochara picta, *Fauv.* This species was as abundant as in Pennsylvania, being gregarious on mushrooms. My types of this species are from Mr. F. Blanchard, for whom it was determined by Mr. A. Fauvel. It has the habit of a Gyrophæna. The antennæ, head, thorax, and last segments of the abdomen are dark; the legs, 3 to 4 segments of the abdomen, and pro and mesothorax are pale ; the elytra are pale, with an ill-defined triangular space posteriorly and sometimes a spot around the scutellum dusky. There is at the middle of the base of the thorax a circular depression marked anteriorly with two comma-like impressions. Length, .10 inch.

Baptolinus? longiceps, *Fauv.* As Mr. A. Fauvel has stated that he had seen examples of *longiceps* from Canada, special search was made for that species, resulting in the taking of four examples, which, while not agreeing with Mr. Fauvel's characters of *longiceps* in every respect as given in his synopsis ("Tête alongée, non transverse, un peu plus etroite que le corselet ; corps brun; élytres ponctuées"), probably do not vary beyond specific limits ; the elytra are rather alutaceous than punctured ; the form of the head—"long or transverse"—is opinionative ; the colour of the elytra, thorax and head, piceous. One example taken here and two others at Ligonier, in the Alleghanies, are in every way identical

Mr. A. D. Hopkins, Entomologist of the West Virginia Agricultural Experiment Station, to whom one of the Canadian examples was submitted for comparison, kindly states that there is "little perceptible difference" between it and that named *longiceps* for him by Dr. Riley through the National Museum. In the seven examples seen no sexual differences are observable in the head or abdomen. I have examples of a species occurring in the White Mountains of New Hampshire, which is quite different, having a very large head, especially the ♂. It has received the name *macrocephalus*, Nord, but from which it differs by not having the 6th ventral segment of the ♂ emarginate and the thorax tripunctate (Mannerheim's description). I have two female examples from Alaska—one from Wrangel with the thorax tripunctate (*macrocephalus*) agreeing in every other essential point with the New Hampshire females; and one from Prince of Wales Island, with the thorax bipunctate, entirely pallid, and .15 inch long, but otherwise agreeing with the Wrangel example; more material, however, must be seen before their identity can be assured. Thus it appears there are at least three distinct species of *Baptolinus* inhabiting North America, whatever may be said of names. This is the species mentioned as *pilicornis* in CAN. ENT., XXIV., 293, but more material shows that the head is smaller than in that species, the description of which otherwise is fairly applicable; and it is in many ways different from the New Hampshire species. In the article referred to, read (Rev. Entomol., VIII, 117)., *B. longiceps*, Fauv., instead of as in lines 28-29. Mr. F. Blanchard mentions (*in litt*) an example with the head scarcely punctured, taken by him in North Carolina, which probably belongs here.

Dicerca, sp. Two examples, ♂ and ♀, were taken in the lake, which seem to be nondescript; in size and sculpture they resemble Chrysea, *Mels.*, to which they were about to be referred till the terminal ventral segment of the ♀ was observed to be rounded; the same segment of the ♂ is truncate and rectangularly emarginate, and the middle tibia toothed. Other examples were subsequently seen in another collection, and it is possibly confused in northern cabinets with *chrysea*, from which it seems best separated by the sexual characters of the female.

Aphodius leopardus, *Horn*. This species occurred in some abundance, as it likewise did at Parry Sound on the Georgian Bay, and at intermediate points. It was not taken with the other species about cow-yards, but on paths through the forest. Before the introduction of domestic

cattle it probably lived in the ejectamenta of deer, moose and other wild animals ; only one example of *lentus* was taken, and that in the forest ; *fossor* was common, and whether it was originally introduced into America from Europe is not free from doubt—it seems to inhabit the colder and mountainous regions, and in Pennsylvania is not uncommon in the Alleghanies. *Ruricola* and *fimetarius* were excessively abundant everywhere, and seem to follow cultivation. *Inquinatus* has not as yet appeared in this district.

Dialytes Ulkei, *Horn.* Two examples were taken at Sparrow Lake and another at Rosseau, about 50 miles northward. The type of the species was taken at Deer Park, Maryland, and it is not known to me whether it has ever been duplicated.

Leptura Canadensis, *Oliv.* Occurred in some abundance ; it breeds in the bark of dead pine trees like *Urographus fasciatus* does in that of oak, without entering the wood. All the females seen had the base of the elytra red ; there is no uniformity in the coloration of the outer joints of the antennæ of the ♀ ; the 3rd joint is usually black, with sometimes a pale spot at base ; the 4th is commonly pale at base for half its length, sometimes the lower side is pale for its whole length and the upper black, or again there is merely a pale spot at base ; the 5th is mostly half black, but sometimes with only a pale basal spot ; the 6th may be altogether pale, or with the apex black, or with it spotted on one side or on both ; the 7th is altogether black, but exceptionally with a pale basal spot ; the 8th is altogether pale, with the apex sometimes black ; the 9th is as the 7th ; the 10th is usually pale at base, but sometimes altogether black. The antennæ of the ♂ are black, but in some examples there is a pale spot at the base of joints 6 and 8. These particulars have been entered into to show that antennal colour variation cannot be used to separate into species the variable forms now included in *Canadensis*.

Leptura vagans, *Oliv.* (var. *brevis*, Kirby). This variety should be placed in our catalogue, inasmuch as it exists locally of a fairly constant type ; that is, with dark elytra with a sulphur-yellow discal vitta on each ; this was absent in one example, which was entirely black. The *vagans* form has usually yellow elytra, some examples being marked with brown indefinitely. Without notice it requires some research to discover that *brevis* is *vagans*.

Adoxus obscurus, *Linn.* (var. *vitis*, Fab). This was beaten in great abundance mostly from willow, though that this is its only food-plant is

not affirmed. The variety *vitis* is light brown, very constant in colour, and so far the only form occurring in Canada. The variety *obscurus* is taken abundantly in places throughout the Rocky Mountains to Arizona and New Mexico; typically it is black, but many of the examples are rufous, and in some of these the rows of punctures on the elytra are black, causing a vittate appearance. This rufous form is readily distinguished from *vitis* by the greater intensity of the colour and the much coarser punctostriation of the elytra. These two forms likewise occur in Northern Asia and Europe, as well as three other named varieties.

Dysonycha pennsylvanica, *Illig.* (var. *limbicollis*, Lec.) was taken in great numbers from Polygonum hydropiper, which it had nearly defoliated.

Systena marginalis, *Illig.*, was beaten in great abundance from the dwarf oaks growing among the highest elevated rocks.

Xilophilus, n. s. About a dozen examples of this were taken at one time by bush-beating, but owing to their minuteness only two were found in the bottle, which contained many other insects. It is about half the size of *piceus*, which it resembles in colour, and in having a transverse basal impression on the thorax, though deeper; the elytra are deeply circularly impressed at base, giving rise to two tubercles well separated by the suture; the punctuation of the head and thorax is fine and dense, that of the elytra coarser; between each facet of the eye may be seen a clavate bristle, not extending beyond the facet. The first three joints of the antennæ and the tarsi are pale. The insect is piceous-black, finely cinereo-pubescent, .045 to .05 inch long, and may be called *tuberculifer*, to preserve it from the oblivion often incidental to such small things.

? Dryocœtes, *Sp.* This is probably the species cited in Packard's Forest Insects, p. 810, (5th Rep. U. S. Commission), as *Dryocœtes*, *? affaber*, found by Mr. W. Hague Harrington in the cones of Pinus resinosa. This insect by difference of antennal club and tibial form does not appear to be a true Dryocœtes; neither by colour nor elytral striation and punctuation does it conform to Mannerheim's description of *affaber*. Examples were sent to Prof. A. D. Hopkins, of the West Virginia Experiment Station, for comparison with *affaber* as determined by Mr. Eichoff, who writes, "I have compared it with my examples of *Dryocœtes*, and find it quite a different thing from any of them; in fact, it differs so widely that I would pronounce it a new species. * * In the club of the antenna and tibia it differs from the other species so much that we might say it belonged to another genus." This species breeds in the cones of Pinus strobus, which grow to the length of 6 or 7 inches; the eggs are probably deposited in the young cones early in the season, the vitality of which becomes so much impaired by the larvæ that they drop to the ground when 3 or 4 inches long. Several of these collected the last week in July contained larvæ apparently full grown. Cones opened Sept. 10th contained the perfectly chitinized and maturely coloured beetles—20 or more in each. Therefore the pupa state must have been brief.

NEW NORTH AMERICAN HOMOPTERA.—NO. VI.

BY E. P. VAN DUZEE, BUFFALO, N. Y.

1. AMALOPOTA FITCHI, *n. sp.*

Closely allied to *A. Uhleri.* Smaller; elytra smoky, about twice banded with white; nervures carmine, ocelli apparently wanting. Length, 6 mm.

Male: Vertex shorter and broader posteriorly than in *Uhleri*, hind margin very feebly emarginate, apex of the pronotum not advanced beyond the base of the lateral keels; frontal keel, viewed from the side, broader and more strongly rounded, with a more conspicuous notch at the base of the clypeus than in *Uhleri.* Antennæ ligulate, slightly narrowed at base, the sides thickened and parallel beyond, setigerous notch deeper than in *Uhleri.* Eyes very feebly emarginate below. Pronotum, viewed from above, less acutely angled before and exhibiting a slightly thicker edge than in *Uhleri*, the expanded sides subquadrate with rounded angles. Rostrum only attaining the apex of the hind coxæ. Elytra similar in form to those of *Uhleri*, the neuration nearly the same but with fewer apical areoles, these being ten in number from the tip of the clavus to the apex of the subcostal nervure; subapical areoles six, of which the first (outer) is large and oblong, the second small and triangular, and the third the longest; basal nervures four, long.

Colour pale yellowish-white, more obscure on the mesonotum and abdomen; sides of the face with a transverse carmine band between the base of the antennæ and the eye which is extended along the sides of the thorax where it becomes darker; abdomen sanguineous above, the genital segments brown. Eyes and tip of the rostrum black; antennæ reddish-brown, the thickened edges darker. Elytra blackish-fuscous; a basal elongated yellowish spot on the costa including the rounded elytral appendage; beyond this are two rounded dots, a broad transverse median band not touching the costa, and a large angular spot on the third and fourth subapical areoles sending a branch to the apex of the costa and another to the middle of the apical margin, whitish-hyaline; narrow costal area white with four brown spots, the stigmatal deeper and crossed at apex by a heavy carmine veinlet; nervures carmine-red, heavier about the stigmatal region, around the apex alternated with white; costa and a line on the commissure near the apex of the clavus, yellowish. Wings whitish-hyaline, with slender sanguineous nervures.

New York. Described from a single example beaten by me from a tree of the wild black cherry among the hills about twenty miles south of this city, on July 28th, 1892. This delicate little creature is a very interesting addition to our list of North American Derbidæ. Though quite distinct it is closely allied to the *A. Uhleri*, described in 1889, from Western New York specimens. (See CAN. ENT., Sept., 1889). The characters of genus *Amalopota*, founded by me for the latter species, must be somewhat modified for the reception of *Fitchi*, as in this species the ocelli seem to be wanting, while in the *Uhleri* they are quite distinct, though small and but poorly defined. This genus, though certainly valid, is very near *Anotia*, and forms a connecting link between it and *Otiocerus*.

2. CICADULA SLOSSONI, *n. sp.*

Form and ornamentation of *C. variata* nearly, but much smaller, with the vertex shorter and the black markings more elaborate. Length, 2½ to 3 mm.

Vertex ¼ longer on the middle than next the eye, blunter before and more rounded in both directions than in *variata*. Whole head much more deeply and coarsely punctured, the clypeus a little more narrowed apically, and the outer margins of the cheeks under the eyes shorter and more deeply excavated, with the outer angles more prominent than in *variata*. Pronotum distinctly transversely wrinkled, omitting the broad posterior margin which is closely punctured ; in *variata* the pronotum is nearly smooth and more convex. Sides of the pronotum shorter, with the lateral angles more rounded and the latero-posterior edges more oblique than in *variata*. Last ventral segment of the female long, closely appressed over the base of the pygofers, the hind margin slightly waved, not distinctly notched on the middle as in *variata*. Valve of the male shorter than in *variata*, with the apical margin but feebly arquated ; the plates longer and with their attenuated points longer and less recurved than in the larger species.

Colour : Head yellow ; vertex with a large oval black spot on each side including a yellow dot and sending a branch anteriorly to the eye, apex with two large transverse black spots ; about four broken arcs on the base of the front, a cloud beneath the eye, all the sutures of the face and the median line black, the latter expanded on the apex of the clypeus and the disc of the front. Antennæ dusky. Pronotum tinged with yellow anteriorly and marked with black along the fore border, and a double brown longitudinal median band widening on the hind margin.

Scutellum black, with the tip, the lateral margins anteriorly, and a median line reaching only to the transverse impressed line, yellow. Elytra white, dusky toward the apex, marked as in *variata*, with oblique brown bands forming a lozenge anteriorly, including a pale commissural spot, and an x posteriorly with the tip of the clavus as its centre, the median bands being common to both marks. These brown bands do not attain the costal margin, and are more strongly distinguished than in *variata*. Abdomen and pleural pieces deep black, the margin of the tergal pieces slenderly yellow, venter sometimes yellow with the segments and connexivum bordered within their margins with blackish. Legs brown, the joints and tibial spines pale.

New York; New Hampshire. Described from three examples; one male taken by me at Lancaster, N. Y., July 12th, 1889, a female taken at "High Bridge," New York City, in June, by Mr. E. B. Southwick, and a second female taken on the summit of Mt. Washington by Mrs. Annie Trumbull Slosson, to whom I take pleasure in dedicating this pretty little species as a slight tribute to her persevering devotion to the study of entomology.

3. Chlorotettix necopina, *n. sp.*

Form and size of *tergatus* nearly. Vertex with a black transverse band between the eyes. Colour above greenish-testaceous, marked and clouded with brown; elytra fuscous, with strong white nervures. Length, 7 mm.

Vertex a little more produced than in *tergatus*, and the front proportionately longer and narrower; ocelli contiguous to the eyes. Last ventral segment of the female thin, broadly and deeply cleft nearly to its base; this incisure at its apex armed with a small blunt tooth, the lateral lobes ovate, in one example feebly angled at apex. Pygofers stout, very slightly exceeded by the oviduct, and armed with a few stout brown bristles. Other characters about as in *tergatus*.

Colour: Beneath pale greenish tinged with testaceous, especially on the front, which is marked on the sides by about ten nearly obsolete brown arcs, and two brown dots are at the base of the clypeus; eyes dark brown edged with pale. Vertex with a broad transverse blackish band just behind the ocelli. Pronotum testaceous, pale before and on the median line, either side of which is a brown cloud, and a smaller one occupies the latero-posterior angle, transverse wrinkles less distinct than in *tergatus*. Scutellum marked with a piceous triangular spot within the

basal angles, the median line, a dot on either side, and the impressed line brown. Tergum fuscous, testaceous on the sides, the segment, edged with pale. Elytra fuscous-brown, nervures conspicuous, white, brown at apex. Wings smoky, iridescent, nervures brown. Legs pale testaceous, claws and tip of the rostrum piceous.

Mississippi. Described from two female examples kindly sent me by Mr. Howard Evarts Weed.

This very distinct species is quite anomalous in the genus in which I have placed it by its dark colouring and conspicuous markings, thus allying it with *Limotettix parallelus*. In most of its characters, however, it is closely related to *Chlorotettix tergatus*, near which it must be placed.

4. ATHYSANUS EXTRUSUS, *n. sp.*

Form of *A. variegatus*, Kirschb., broad and short; pale greyish-yellow, vertex with a transverse blackish band, elytral nervures pale. Length, 4½ mm.

Vertex longer and more pointed than in *obsoletus*, nearly ⅓ longer on the middle than next the eye; a broad transverse band on the disc and an angular spot at apex blackish, each bisected by the longitudinal median pale line. Face pale, front black with about eight pale arcs or pale with as many blackish arcs, sutures of the face and a double longitudinal line on the middle of the clypeus black; antennæ pale, set on a black cloud. Clypeus slightly narrowed to the truncated apex, its base arquated. Cheeks feebly angled without, exterior to the outer line of the loræ longitudinally wrinkled; tip of the rostrum black. Pronotum hardly longer than the vertex, mottled with dusky and showing four or five pale longitudinal lines, more or less obsolete; hind edge strongly concave, surface transversely wrinkled, broad anterior margin smooth and calloused; sides longer than in *obsoletus*, carinated; latero-posterior margins very oblique, almost continuous with the posterior margin. Scutelum with four or five brown spots, the posterior sometimes obsolete. Elytra short and broad, hardly exceeding the tip of the abdomen, pale, the areoles more or less heavily edged with fuscous. Abdomen brown or almost black, edge fulvous, with a few fulvous clouds beneath; pleural pieces brown, pale margined; legs pale, the femora banded with brown and the tibiæ dotted at the base of the spines. Valve of the male broadly triangular, apex obtuse; plates irregularly quadrangular, widely spreading, touching only at base; outer angles produced, subacute, armed with a few long bristles; inner angles rounded; styles very long, extending for

half their length beyond the apex of the plates, ligulate in form and curved downward and outward at apex; pygofers rounded at apex, almost equalling the plates, the small anal aperature placed superiorly.

New York; Connecticut. Described from three males. One taken at Portage Falls, N. Y., May 30th, 1888. The other two specimens were taken by me in Connecticut in the spring of 1883. One of these was swept from weeds and bushes on the hills about Northford, June 26th; the other, a very deeply coloured example, I found in a grove on Prospect St. in New Haven, June 4th. The long extruded styles of the males will at once distinguish this from any other of our described species of *Athysanus*.

5. ATHYSANUS INSTABILIS, *n. sp.*

More elongated than most of our species of this genus. Black, irrorated and finely marked with pale yellow. Elytra pale, the areoles edged with fuscous. Length, 4–4½ mm.

Head obtusely pointed before; vertex about ⅓ longer on the middle than next the eye, passage to the front well rounded, base with a few impunctured areas. Ocelli large, fulvous, distant from the eyes; temples broad; front convex, the sutures arquated at the antennæ and incurved at apex; clypeus feebly narrowed towards its slightly rounded apex; cheeks rather narrow, but feebly angled, not exceeding the clypeus. Pronotum rather long, with the sides long and carinated, latero-posterior edges straight, angles prominent, obtuse, surface strongly punctured or shagreened. Elytra long, with the appendix well developed. Valve of the male short, obtuse at apex; plates forming an equilateral triangle, fulvous clouded with dusky, their edges nearly straight, fringed with pale bristles. Last ventral segment of the female slightly produced and rounded on the middle, feebly arquated either side within the short subacute lateral angles; pygofers rather small, slightly exceeded by the oviduct.

Colour black. Base of the vertex, outer edge of the cheeks, and margins of the eyes slenderly yellow. Two transverse spots on the disc of the vertex near its base, two lines anterior to these, one or two dots near each eye, an angled slender line on the apex including a dot behind, a dot on the temples, about six arcs, a basal spot and a longitudinal line on the front, the latter expanded against the base of the clypeus, and

a spot on each lora, fulvous-yellow; disc of the cheeks with a pale cloud which sends a branch along the upper edge of the lora to the front. Antennæ black, base of the seta pale. Pronotum irrorate and narrowly edged with pale, with a few irregular yellowish marks along the anterior border. Middle line of the scutellum, a curved mark either side of this on the basal field and the margins yellow, the latter interrupted at their middle. Narrow edges of the abdominal segments and the spines of the pygofers pale. Femora with a fulvous band; hind tibiæ yellow, dotted with piceous, the spines and claws whitish. Elytra soiled white, smoky at tip, nervures concolorous broadly bordered with fuscous, the costal and commissural pale.

Michigan; Colorado. Described from one male and three female examples taken at Agricultural College, Michigan, by my friend Mr. G. C. Davis, and another female received from Prof. C. P. Gillette, taken in Colorado.

This insect is nearly allied to the species described by me as *Athysanus striatulus*, Fall. (?), in Ent. Am., vi., p. 134, like which it has a well-developed elytral appendix. Two of the specimens before me have a second transverse nervure between the first and second sectors of the elytra, thus allying them to *Deltocephalus*, but for the present it seems better to place them in genus *Athysanus*.

Our described North American species of *Athysanus* may be arranged as follows:—

A. Stout species with a short vertex and abbreviated elytra, without an appendix:—

1. *A. obsoletus*, Kirch. 2. *A. extrusus*, Van D. 3. *A. comma*, Van D. 4. *A. plutonius*, Uhler.

B. Smaller, more elongated species, with more produced subconical heads and longer elytra without an appendix:—

5. *A. Curtisii*, Fitch. 6. *A. bicolor*, Van D. 7. *A. obtutus*, Van D.

C. Species similar in form to those of the last section, but with a shorter head, flatter vertex, and longer elytra with a well-developed appendix:—

8. *A. instabilis*, Van D. 9. *A. striatulus*, Fall. (?).

NOTES ON A POLYMORPHIC BUTTERFLY, SYNCHLOE LACINIA, GEYER (IN HUB. ZUTR.), WITH DESCRIPTION OF ITS PREPARATORY STAGES.

BY W. H. EDWARDS, COALBURGH, WEST VA.

"Godman and Salvin, Rhopal. I., p. 177, 1882, under the specific name *Lacinia*, place *Saundersii* and *Tellias*, Bates; *Quehtela* and *Ardema*, Reakirt; *Paupera*, Felder; *Mediatrix* and *Misera*, R. Felder; *Pretoria*, Boisduval; *Crocale*, Edwards; *Adjutrix*, Scudder, and *Adelina*, Staudinger; all of which they consider but inconstant forms of one species. From their works we quote: 'Between these extremes, *Adelina* and *Saundersii*, every gradation of colour can be traced, and all the rufous markings, as well as the yellow ones of the under side, can be exhibited in different individuals from their maximum development till they vanish altogether. . . . In the Southern States of North America, a form occurs which is very like *Saundersii*, and is prevalent in Texas. This is *Adjutrix*, Scudder, but we doubt the possibility of maintaining its distinction. In Arizona another form occurs, *Crocale*, Edw., which we take to be undistinguishable from *Adelina*, and therefore connected with the whole series.'" Quoted from E. M. Aaron, in Papilio IV., p. 177, in his paper entitled List of a Collection of Diurn. Lepid. from Southern Texas. Mr. Aaron adds: "Among these Texas captures were *Saundersii*, *Adjutrix* and *Mediatrix;* the latter two were taken in copulation."

I have not access to the works of Godman and Salvin, but Dr. Skinner informs me that they figure eleven forms of this species, and its localities extend even to Peru and Bolivia. These authors based their opinion as expressed not at all, so far as appears, from rearing the larvæ. Indeed, until recently, no one seems to have been acquainted with any of the preparatory stages, not only of *Lacinia*, but of any species of the genus *Synchloe*. In 1892, Prof. Packard sent me in a tube with alcohol an adult larva and pupa, received by him from Prof. Tyler Townsend, of Las Cruces, N. M. In 1893, by the aid of Mr. T. D. A. Cockerell, also of Las Cruces, I have been able to study all the stages from egg to pupa. He wrote 7th July: "I saw a black and white butterfly, rather like a small Limenitis (was it not Synchloe *Crocale?)* settle on two or three leaves of a sunflower." On 26th July: "Yesterday, Prof. Owen took me to his ranch, a short distance from Las Cruces, and I got there some *Crocale* larvæ, which I send herewith. I find that the young are gregarious, feeding as closely as they can stand on the upper side of a leaf of

Helianthus, which they skeletonize, instead of devouring the whole thickness, as older ones do. They remind me of the young larvæ of Vanessa *Urticæ*. The older larvæ I send are of a red variety. The larvæ are trimorphic, with forms as follows:

1. *nigra*, a black form.
2. *bicolor*, black with broad red dorsal stripe.
3. *rufa*, red form."

Again: "The Helianthus appears to be the common H. annuus. One finds several larvæ (adult) on one plant. Each has a leaf to itself, and they select the large leaves, not the young tops. They rest on the middle of the leaf, feeding by day, exposed to the sun. They must be inedible to birds, as they are very conspicuous. They gnaw holes out of the middle of the leaf. I could not see that they make any sort of web, and when alarmed they drop to the ground. At one place I found three or four, all black. One larva found on a narrow-leafed composite (not in flower) was about to pupate. It may have wandered from a sunflower, though there was none nearer than several yards. It was pupating quite exposed on the leaf."

On July 29th: "Yesterday, I found some batches of larvæ about one-half grown, still gregarious, and for the most part on the under side of the leaves. One batch was entirely of black larvæ, but another, to my surprise, contained all the variations mentioned in former letter. In the majority of cases a brood is all of one colour, but at least sometimes the three colours may all appear in one brood. I also enclose a *Crocale* butterfly which was caught and killed by a large Asilid fly (Proctacanthus Philadelphicus, Mocq.)"

Aug. 27th: "Yesterday I was in Juarey, Mexico (across the river opposite El Paso), and got a lot of insects. Among them both typical *Crocale* and the orange-shaped *Adjutrix*, as also a very pretty aberration, *rufescens*. I send all these herewith, as also what I call ab. *nigrescens*, an unusually black form of *Crocale* proper, which I bred here in Las Cruces."

There came two labelled *rufescens* and considerably unlike. One has a broad red band across both wings reaching nearly to costa of primaries, with marginal red spots on both wings; the other has the red band on hindwings one-half wider than usual and of deep colour, but there is nothing of it on forewing, nor are there marginal red spots. Both these varieties, I doubt not, have received species names. The bred *nigrescens*

has the spots that compose the white mesial band on hindwings reduced to mere streaks of white on the nervules. No doubt this has received a species name. But one of the Juarey examples is plainly *Ardema*, of Reakert: "hindwings black, with an indistinct orange-brown shade across the disk."

Mr. Cockerell wrote 9th Sept.: "On the college farm, yesterday, I found a batch of Synchloe eggs on the under side of a sunflower leaf. They are like the eggs I sent before. They are like the eggs of Melitæa, as figured by you in Butt. N. A. Synchloe seems to be practically a Melitæa in its earlier stages. I send one example of larva, black with numerous yellow-white dots, a sub-variety of the black type. I found several such."

During the season I had also received several batches of larvæ of Phyciodes *Carlota*, from Montana, and eggs of same from Colorado, and the larvæ from the *Crocale* eggs were reared at same time with the others, so that I was able to compare the two species step by step. The eggs of the two are in no way distinguishable, nor are the larvæ in the first two stages; as regards shape and armature they are alike in the succeeding stages, but differ in coloration. But the pupa of the Synchloe is not like that of *Carlota*, which is of the typical Phyciodes shape and appearance, and like *Tharos*, but is closely like the pupa of Melitæa *Baroni*, as given in Butt. N. A., Vol. III, pt. 3. The stages are described as follows:—

Egg.—Similar to Phyciodes *Tharos:* obovoid, truncated at top, rounded at bottom, the lower three-fifths, or about that, examples varying, covered with irregular shallow indentations; the upper part ribbed, about twenty-four ribs, not much elevated, not sharp, the interspaces roundly and shallowly excavated; top slightly depressed; colour when first laid pale green, later changing to green-yellow. Laid in close clusters side by side in several rows. In the cluster under view each complete row (4) contained just nine eggs, and there were shorter rows on either side of these; on the top was part of another layer, placed irregularly and more or less on their sides. These eggs were believed to have been laid 8th Sept., or on the day when found, and hatched on 15th, or after six days.

Young Larva.—Length at one day from egg, .06 inch; cylindrical, even, each segment well rounded; furnished with many tapering black hairs, or processes, of which those on segments 3 and 4 are in cross line on the middle, four on either side above the spiracular line; on 2 is a black oval chitinous patch on top of dorsum, on which are six shorter

processes in line, and another on each side just below the patch; also two others in vertical row to the front and opposite the spiracle, on segments 5 to 12 inclusive six processes, three on either side, arranged in triangle as usual in the family; on the front of 13 are six in cross line, and the triangle on either side to the rear; along base of body one similar short process over each foot, two on 5 and 6 each, and one each to the remaining segments up to 12, in addition to which is a still shorter process over base of each proleg, and on 5, 6, 11 and 12 below the other; colour green, with a brown tint; head scarcely broader than 2, obovoid, slightly bilobed, shining black-brown, with scattered short processes over the face like those of body. Duration of this stage three days.

After first moult: Length at one day, .1 inch; colour variable, some examples being light brown with a green tint, some of brown of darker shades; the spines as in Phyciodes, rather short, slender and tapering, glossy black, with short bristles about them at a small angle, and rising from shining black tubercles; head cordate, glossy black, with many curved processes on the front. Duration of this stage, three days.

After second moult: Length at one day, .14 inch; colour variable, some larvæ being wholly black, some rust yellow, some of this last have on dorsum and lower half of side, a dark brown sub-dorsal band intervening; the spines rather longer in proportion than before, otherwise similar; head as before. Duration of this stage, three to four days.

After third moult: Length at one day, .3 inch; shape and spines as before; the colour as before, but the russet more red, and on those which are wholly russet are two black cross lines to each segment, one on the rear, the other at the junctions; head as before. To next moult, about four days.

After fourth moult: Length at one day, .52 inch; variable as before, the rust colour deepened into red-fulvous. At about six days was full-grown.

Mature Larva.—Length, .1 to 1.2 inch. Cylindrical, even; colour very variable, some being bright red-fulvous; at the junction of the segments a stripe of glossy black, and on 4 to 10 inclusive a narrow, dull black stripe near the rear of each; under side greenish-brown, as is also the front of 2; on the middle of 2 a dorsal chitinous collar, on which are six small spines, three on either side the mid-dorsal line; a little below these another; a long spine below the spiracle; the spines on the succeeding segments arranged as in Melitæa, black, shining, not long in pro

portion to the size of the body, rising from shining black tubercles, tapering to an irregular top, and surrounded by many short black bristles set at a small angle; head cordate, black, glossy, with many tapering hairs or processes on the face. Other examples are yellow-fulvous; others have a continuous red-fulvous band on dorsum, rather wider than the tubercles of the dorsal row of spines; or this band is macular, a rectangular spot being on each segment, bearing the spine; the lower part of side is also red-fulvous, and the intervening space is dark-brown, forming a sub-dorsal band the length of the body. The red on dorsum is sometimes reduced to a small patch on each segment, on rear. Others are black throughout, except that over the upper part are specks and minute spotes of white or yellowish; others are black, but from the second lateral row of spines to basal ridge is a band of greenish-white and black, mottled, and sometimes the upper edge of this band shows a macular fulvous line. In all, the spines are black. There are at least three distinct types of larva:

1st.—All red- or yellow-fulvous.

2nd.—The dorsum and lower part of side fulvous; the subdorsal area dark-brown.

3rd.—All black, or black with a greenish band on side.

From fourth moult to pupation, about seven days.

Chrysalis.—Length, .45 to .52 inch ♂; .55 to .64 inch ♀. In an example of which the length was .52, the breadth both at mesonotum and abdomen was .2 inch; cylindrical, shape of Melitæa; head case short, narrow at top, and a very little incurved, the sides excavated; mesonotum rounded both ways and rising to a slight prominence on the rear, but not carinated, followed by a slight depression; abdomen conical; the wing cases somewhat elevated, bevelled down to the abdomen on the margin; colour the first day white, pink-tinted, then becoming ivory-white, specked and spotted with black, with some black bands or stripes; a stripe across the top of head case, a band from end to end on the ventral side; some spots on the head case; on mesonotum two spots in front, two on rear, one on either side (at the tubercle); in some examples these are mere points, but in others large, and form a ring around the middle of the mesonotum; on the abdomen a black crescent on the anterior side of each tubercle; on middle of wing case a bent bar, two patches at hind margin, and several dots; the tubercles correspond to the spines of the larva, and are low, conical, orange. But there is great

variation in the size of the black marks, and there is every grade to a nearly black pupa, black marked with white. No two of the melanic examples were alike. Duration of this stage, five to seven days. By the above, it will appear that the pupæ also are polymorphic, some being almost wholly white, some almost wholly black, with all sorts of intergrades.

These resulted from the pupæ reared in July and August imagos which came out between 2nd August and 19th :—

1st.—From all red larvæ.....3 orange banded, or *Adjutrix*
8 white banded, or *Crocale*

2nd.—From all black larvæ.....15 .....*Adjutrix*
3 .....*Crocale*

From pupæ of the succeeding brood of larvæ, the imagos out between 29th August and 8th September :—

1st.—All red larva.....4 .....*Crocale*

2nd.—All black larvæ.....2 .....*Crocale*
4..... .....*Adjutrix*

3rd.—Red backed larvæ.....13..... *Crocale*
3..... *Adjutrix*
1 with a very slight orange tint.
1 very red and broad band.

The last brood of larvæ of the year, out of eggs hatched Sept. 15th, hibernated after third moult early in October. As this is exactly the habit of the Phyciodes (as *Nycteis* and *Carlota)*, we may assume that the larvæ on their waking up early in spring, (Feb. or March, no doubt, at Las Cruces), would be in pupæ within two weeks thereafter, to give imagos a few days later. Probably, therefore, the butterflies are on the wing by April, and thereafter a brood will appear at least monthly. If this is so, the first larvæ received by me, in July, would have come from the third generation of butterflies of the year. This generation, from 29 pupæ, gave 18 *Adjutrix* imagos to 11 *Crocale*, or 62 per cent. *Adjutrix*, and 38 per cent. of *Crocale*. The following generation, from August larvæ, out of 28 pupæ gave 19 *Crocale* to 9 *Adjutrix* (including all red-banded), or 68 per cent. *Crocale* and 32 *Adjutrix*. The proportions in the two generations were nearly reversed, and as the season goes on there would seem to be a tendency to produce the white banded form. It will be of interest to watch the outcome of the hibernating larvæ, and I hope by Mr. Cockerell's aid next season to learn which form prevails in the two or three earliest generations.

As I am correcting the proof of this paper, I can add from a letter of Oct. 21st, from Mr. Cockerell ;—"The Synchlœ is still flying here in fair numbers. I find that in a state of nature the larvæ hibernate gregariously in the dead, curled up leaves of the sun-flower.

ON A SEEMINGLY MICROLEPIDOPTEROUS LEAF-MINER OF THE NARROW-LEAFED COTTONWOOD.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA, W. I.

In the same leaves of *Populus angustifolia* in which were found the tenthredinid (lepidopterous?) leaf-miners,* in the Canada Alamosa, northern Sierra county, N. Mex., in June, 1892, there were also found specimens of a very distinct leaf-miner. It bears a striking resemblance to the leaf-miner of the vine found in the Mesilla valley of the Rio Grande. It possesses the sucker-like mouth of that miner. After being mounted in glycerine on a slide for several days, however, the outer portion of the distended sucker-like organ became transparent, exposing within what appear to be two stout rounded mandibles with teeth on their inner edges.

Since this miner is footless, and yet possesses toothed mandibles, I infer that it is microlepidopterous. It mines on the lower side of the leaf, not being visible from above.

Description of miner.—Length, 3½ mm. Colour entirely white. Whole larva fleshy, consisting of thirteen segments. Widest anteriorly, narrowing posteriorly. Segments laterally rounded, the anterior ones especially projecting on sides, the body being laterally deeply incised at sutures. Head rather triangular in shape, running to a blunt point anteriorly, widest behind—where it is less than ⅔ the width of prothoracic segment. Anterior end of head terminated with a sucker-like organ distally distended, constricted at base into a neck-like junction with the head, enclosing and concealing a pair of apparently corneous jaws or mandibles. Mandibles are a little longer than wide, rounded-oblong, furnished on inner edge with three recurved or posteriorly directed teeth. Antennæ springing from anterior lateral edge of head just posterior to the neck-like constriction of the sucker-like capsule which encloses the mouth-parts. The antennæ are apparently 4-jointed, but possess some supernumerary bud-like joints. First two joints about same length, the basal one slightly thicker; third joint less than half as thick and shorter than second, accompanied by two slender bud-like or tooth-like joints which spring from the second joint and are shorter and narrower than third joint. Fourth joint a little shorter and smaller than third, about size of the supernumerary joints just described, accompanied by a shorter super-

*See article "Another leaf-miner of Populus," in Journ. N. Y. Ent. Soc., Vol. I.

numerary joint which is terminated by a bristle. Eyes situated immediately behind base of antennæ, on outer edge of head, appearing as a black dot with three other dots in a row behind. Prothoracic segment widest; mesothoracic and metathoracic segments about same width, and a little narrower; segments 5 to 7 about equal, and much narrower than thoracic segments; 8 to 11 successively and gradually narrowing, 12 a little longer than 11; 13 widened, especially posteriorly, narrowing anteriorly, incised on lateral edge. All the segments nearly the same length, the posterior ones more elongate for their width. head longer than prothoracic segment. Surface of body very thinly clothed with a few fine moderately long hairs, some on head. Feet and legs entirely absent.

Described from an alcoholic specimen in a glycerine mount. A second specimen, about the same size, has the segments more approximated, body hardly as tapering posteriorly, lateral incisures hardly as deep, and the anal segment not widened. It is, perhaps, the same species. Canada Alamosa, June 17.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the Society was held in its rooms in Victoria Hall, London, on the 11th and 12th of October, the vice-president, Mr. J. M. Denton, occupying the chair in the absence of Mr. Harrington, the president, who was unfortunately unable to be present. The reports of the treasurer, librarian and curator, the council, the botanical, ornithological, geological and microscopical sections were read and approved Several interesting papers were read and addresses delivered. A number of rare and remarkable specimens were exhibited. Full reports of the proceedings will be published in the forthcoming annual report to the Legislature of Ontario.

The following gentlemen were elected officers for the ensuing year:—

President—W. Hague Harrington, Ottawa.

Vice-President—J. Dearness, London.

Secretary—W. E. Saunders, London.

Treasurer—J. A. Balkwill, London.

Directors—Division 1—James Fletcher, F. L. S., F. R. S. C., Ottawa.

" 2—Rev. C. J. S. Bethune, F. R. S. C., Port Hope.

" 3—Gamble Geddes, Toronto.

" 4—A. H. Kilman, Ridgeway.

" 5—R. W. Rennie, London.

Librarian and Curator—J. Alston Moffat, London.

Editor of the CANADIAN ENTOMOLOGIST—Rev. C. J. S. Bethune, M.A., D. C. L., Port Hope.

Editing Committee—J. Fletcher, Ottawa; H. H. Lyman, Montreal; Rev. T. W. Fyles, South Quebec; J. M. Denton and J. H. Bowman, London.

Delegate to the Royal Society—Rev. T. W. Fyles, South Quebec.

Committee on Field Days—Dr. Wolverton, Messrs. Clement, Elliott and Stevenson, London.

Auditors—J. H. Bowman and J. M. Denton, London.

HYBLŒA PUERA, CRAMER.

BY T. D. A. COCKERELL, LAS CRUCES, NEW MEXICO.

Mr. Butler (P. Z. S., 1892, p. 133) remarks concerning the *Hyblœidæ* (*Hyblœinæ*, I would rather write) as follows:—

"The position of this family is somewhat doubtful; the aspect of the species forcibly reminds one of the Tortrices, but the neuration does not altogether correspond with that of the *Tortricidæ*; at the same time the *Hyblœidæ* do not appear to be true Noctuites." How this may be, I cannot venture to judge, but *H. puera* is very common in Kingston, Jamaica, and as I have bred it, a description of the larva may help to decide the question.

Larva: about 19 mm. long, rather reminding one of the *megacephala* group of *Acronycta*. Body cylindrical, with sparse hairs of moderate length Head shining pitchy-black Body black above, with a more or less interrupted red dorsal stripe; and very narrow subdorsal white stripes, much broken into spots. The black continues as far down as the spiracles, but just above the spiracles is another broken white line, like the subdorsal. There is a narrow yellowish-white band along the lower margin of the black, and below this the body is marbled with grey and pale reddish-brown, a small hair-patch below each spiracle being ringed with white. Abdominal legs pale brown. Thoracic legs shining red-brown. The first 3 and the last body-segments are almost entirely black beneath. Lives in curled-up leaves of *Catalpa*, in which it pupates.

Pupa bright red-brown.

Larva and pupa found in Kingston, May 3, 1892. Three moths emerged on May 10.

Mr. J. J. Bowrey has briefly referred to the larva in Handbook of Jamaica, 1881, p. 118. Moeschler, in his Porto Rico work, says the larva is found on *Crescentia* and *Tecoma*. The distribution of the insect is extraordinary—West Indies, Brazil, Java, Ceylon, Nepal, China, S. Africa, Madagascar, Mauritius, etc.

BOOK NOTICES.

EXPERIMENTAL FARMS: REPORTS FOR 1892. Printed by order of Parliament: Ottawa, 1893.

This valuable "Blue-book" has been before us for some time, having been distributed in April last, but various circumstances have prevented us from noticing it and several other publications, for which we are indebted to the courtesy of the authors. Our readers will, of course, be chiefly interested in the report of Mr. James Fletcher, the Entomologist and Botanist of the Central Experimental Farm at Ottawa, which occupies twenty-four pages of the volume. After mentioning the chief insect attacks of the year, Mr. Fletcher gives an interesting and valuable account of the life-histories of the Hop-vine Borer (*Hydræcia immanis*, Guén.), the Red Turnip-beetle (*Entomoscelis adonidis*, Fab.), the Western Blister-beetle (*Cantharis Nuttalli*, Say), and the Birch Bucculatrix (*B. Canadensisella*, Chamb.); in these there is much new and original matter, as well as a summary of the previous observations of others. The identification of the hop insect, which is also called, from its mode of attack, the "Collar-worm of the Hop," is particularly interesting. Its injuries have been observed for more than twenty years, but it was a long time before the moth was reared from the destructive larvæ and its identity established. The most effective remedy for this insect appears to be the encouragement of the unsavory skunk in the hop-yards; in the northern part of the State of New York and in Wisconsin, this animal has been found most useful from its habit of digging round the infested plants and devouring the worms. The turnip and blister-beetles referred to have been very destructive in the Northwest Territories, the latter attacking the Windsor Bean, while the Birch Bucculatrix has infested the trees in the neighbourhood of Ottawa. Mr. Fletcher also describes several useful parasites which serve to keep in check the currant and willow saw-flies and other injurious insects. The remainder of his report is devoted to an account of the potato-blight which affects the leaves of the plant, and the potato-rot affecting the tubers, and a chapter on lawn grasses and fodder plants.

CATALOGUE OF THE LEPIDOPTEROUS SUPER-FAMILY NOCTUIDÆ FOUND IN BOREAL AMERICA: By John B. Smith, Sc. D.: (Bulletin No. 44 of the United States National Museum). Smithsonian Institution, Washington, 1893.

This volume of four hundred and twenty-four pages will be heartily welcomed by every student of the Noctuidæ of North America. It is not a mere list of species, but a complete bibliographical and synonymical

catalogue. The authority, date and reference are given for each genus, and under each species are given the date, author and place of publication of the original description, followed by any other published references, the synonymy, habitat, and where the type can be found. Anyone who has attempted to keep a record of the published references to our Lepidoptera—and we have all been compelled to do so in some form or other—will appreciate the immense amount of labour that Prof. Smith has performed in the preparation of this work, and must feel heartily grateful that he has now relieved us of a task that few are competent to accomplish satisfactorily. The saving of time, and the satisfaction of knowing that one is not now likely to overlook anything that has been published regarding a species, are no small boons to the student. For a full explanation of the origin and purpose of the work, we must refer the reader to Prof. Smith's somewhat lengthy preface, which will be found well deserving of careful perusal. The general index at the end of the volume makes the work complete, and we have no hesitation in saying that it is the most useful publication on the North American Noctuidæ that has yet been issued from the press. We trust that the author will before long be able to lay us under still greater obligations to him by the publication of his contemplated monograph of the whole of this family of moths.

CORRESPONDENCE.

CORRECTION.

Sir,—In my last paper, "Washington Tenthredinidæ, etc." I find that I have made the following mistakes:—Page 238, line 13 from top, 23 from top, and page 239, line 6 from bottom, the word *labium* should in each case be *labrum*. A. D. MacGillivray.

CALLIDRYAS EUBULE.

Sir,—On the 5th of October last I observed a bright yellow butterfly, much larger than any of our species of Colias, flying in the street here, but it soon passed out of sight over some houses. On the 9th inst. I observed some others, and at last succeeded in capturing what proved, to my great delight, to be a specimen of *Callidryas Eubule*, the first taken in the State of Iowa. Hitherto it has not been seen north of Missouri; though I have collected in this State for ten years, I have never met with this butterfly before, but now I have taken no less than four specimens, all females, and so fresh that they look as if they had just emerged from the chrysalis. Keota is built upon "the divide," and is ten miles either north or south from any heavy belt of timber, or any large stream of water. These specimens must therefore be "wind-visitors," as Mr. Grote terms them, and have been wafted here by the air-currents from the south. A. S. Van Winkle, Keota, Iowa.

Mailed November 4th.

The Canadian Entomologist.

VOL. XXV. LONDON, DECEMBER, 1893. No. 12.

NOTES ON THE OCCURRENCE OF HEPIALUS THULE, STRECKER, AT MONTREAL.*

BY H. H. LYMAN, M. A., MONTREAL.

In the part of Mr. Strecker's Lepidoptera, Indigenous and Exotic, dated Feb. 22nd, 1875, is the description, and on the accompanying plate an excellent figure, of this species from a female sent to that author by the late Mr. Caulfield, and which was probably taken in the previous summer. The specimen was found in Phillips Square, which is about two miles from its nearest known locality, by the caretaker, from whom it passed to the taxidermist of the Natural History Society, who gave it to Mr. Caulfield.

From that time I can find no further record of its capture till that given in the Feb., 1884, number of the CANADIAN ENTOMOLOGIST (Vol. XVI., 39), by the late Mr. Bowles, who recorded having received a specimen of it during the previous year, 1883. He also stated in the same note that Mr. J. G. Jack, of Chateauguay Basin, P. Q., had also a very beautiful specimen of this moth, presumably taken in that locality.

In 1889, when looking into this matter, I wrote to Mr. Jack, at Jamaica Plain, informing him that I had found it recorded in the old minute book of the Montreal Branch that he had found the larva of what was probably a large species of Hepialus at Chateauguay, and asking him for particulars about this matter, and especially whether he had ever succeeding in rearing the larva to imago, or had taken this species there, and mentioning what Mr. Bowles had published in 1884. To this letter Mr. Jack replied that for two or three years in succession he had found a larva which he believed to be a Hepialus in the stems of Acer Spicatum, and one in a stem of A. Rubrum, and another in that of A. Pennsylvanicum; that the stems in which they were found were from one to two inches in diameter; that the borings extended from about a foot above the surface of the ground down into the rootstock, and that the point of exit

* Read before the meeting of the Entomological Club of the American Association for the Advancement of Science, at Madison, Wisconsin, August, 1893.

was usually but a few inches above the surface of the ground ; that the larvæ were searched for and found in late fall or early winter, and that though about a dozen were found he did not succeed in breeding the imago ; and finally that he never took *H. Thule* anywhere, but exchanged with the late Mr. Shaw, of Montreal, for a nice specimen which he afterwards gave to the Museum at Cambridge, Mass.

No further specimens, so far as I have been able to ascertain, were taken till 1885, in which year Mr. Shaw was so fortunate as to secure nine specimens. Mr. Shaw, to the great regret of our members in the Montreal Branch, died in 1886, and I was therefore unable to learn any further particulars from him.

In 1887 I searched in vain for the species, but in 1888 I was successful in discovering it, and took twelve specimens.

The locality where I discovered it, and which was probably the same as where Mr. Shaw had found it, is the brow of the old sea terrace of the post-pliocene period which extends for some miles east and west of Montreal, at a point in the municipality of Côte St. Antoine on the western outskirts of Montreal, and just above the St. Henry Swamp. I only found it in a very limited portion of this locality, not more than 400 or 500 feet in length, and supposed it was restricted to this very small area.

In 1889 I only secured six specimens, though I visited the locality much oftener, and in 1890 one just before starting on a trip across the continent, while in 1891 I only obtained two, and one other was taken by Mr. Winn.

From these facts I feared it was doomed to extinction in this locality, as the Canadian Pacific Railway runs along the brow of the terrace, and the swamp at its base is being drained and cultivated, and will be built over in a few years.

But last year we learned from one of our members that he had taken the species about three miles further west, but on the level swampy tract below the terrace, and some of our members went out on 15th July and two specimens were secured. This year Mr. Winn has traced it out all along this terrace, so that its range is much more extensive than we supposed.

The earliest date upon which I have taken it is 6th July, and the latest upon which I have heard of its being taken is 20th July of this year, but the specimens were worn and ragged.

The species seems to fly only for about fifteen to twenty minutes in

the twilight, as I have never taken it before ten minutes past eight, nor ever after half-past eight. Bright, clear evenings I have found much more favourable than cloudy ones, though I have visited the locality on many evenings without seeing one.

I have never succeeded in seeing where they came from, though I have stood watching intently for them for fifteen minutes or more before they appeared, but suddenly two or three would be in the air together, often out of reach of the net, swinging back and forth in their peculiar oscillating manner, though single individuals have been taken by others while flying along near the ground.

If touched by the net without being caught, they would drop into the grass apparently quite helpless. Six-sevenths of those which I have taken were males, but others have secured a more even division of the sexes.

One of the specimens taken in 1891 was a female, which I kept alive in order to secure eggs. It laid freely an enormous number, and I do not know whether it might not have laid more had it been kept alive longer. It was kept alive for two days in a wooden box, with gauze over the top, and seemed to hang perfectly quiet and to allow the eggs to run from her, as they were not attached, but loose in the bottom of the box. At the end of this time she was found to have been knocking about and spoiling her wings, and so was killed. The eggs were counted very carefully, and were found to amount to the enormous number of 2,151.

The following description was taken :—

Length, .027 of an inch.

Breadth, .022 of an inch.

Even oval, slightly flattened on lower side, perfectly smooth, but dull, like unglazed porcelain.

Colour, a pale honey-yellow when laid, soon turning black.

This female, however, must have been virgin, as the eggs speedily shrivelled, so that I was unable to obtain the young larvæ, or to make any of the experiments which I had contemplated in the direction of placing the eggs upon any likely food-plant. In connection with this subject several questions of great interest arise. It is well known that the moths of this family are very abundant in the Old World, one especially, *Hepialus Velleda*, swarming in Scotland in myriads, yet though we have a great many species on this continent, I do not think that any one can be considered other than very rare, except *H. Mustelinus*, which Packard reported (Proc. Ent. Soc., Phil., III., 394), as not uncommon at

Brunswick, Me., at light, and *H. Argenteomaculatus*, which is stated to be pretty generally distributed, though it is certainly not common in the imago state.*

Now, if the females in this genus produce over two thousand eggs each, it can be easily understood why they are so abundant in Europe, but why are they so rare on this continent?

Mr. D. S. Kellicott, who discovered the larva and pupa of *H. Argenteomaculatus*, found that that species bored in the roots of Alnus incana, but came up into the stem when mature, and Prof. J. B. Smith stated that it bred also in oak, willow and poplar. Mr. Kellicott stated in his paper upon this subject, which he read before this club at the Cleveland meeting, that after these nearly mature larvæ had come up into the stem, large numbers of them were destroyed by woodpeckers.

Upon reading this, it occurred to me that possibly this furnished the key to the mystery of the scarcity of these moths on this continent, and I therefore wrote to an ornithological acquaintance to ask if woodpeckers were more abundant on this continent than in the Old World. This gentleman replied that while he had no definite knowledge upon that question, he should judge that we had in Canada ten to twenty times as many woodpeckers to the square mile as they had in England.

I must, however, confess that even if this estimate be correct it is not an entirely satisfactory explanation, as there are on this continent a number of small species in this genus which no doubt feed in the roots of shrubs or herbaceous plants where woodpeckers would not be likely to find them, which are quite as rare as the larger species. I also wrote to Dr. Strecker to learn whether, so far as he knew, Thule had ever been found in any other locality than Montreal, to which he replied as follows:—"Some years since, an example of *Hepialus Thule* was taken somewhere in Wisconsin, I don't recollect where or by whom, but a sketch was sent me at the time for identification, which I immediately recognized as that species."

In regard to the life-history of the species in this genus, the English entomologists to whose works I have access are extremely vague. Stainton, in his Manual I., 109, says of the genus, "Larva feeding on the roots of plants," which leaves it very indefinite as to whether he means in the roots or tunneling in the earth and feeding on the roots. He even says that the larva of H. Hectus feeds on the leaves of dandelion, and F. O. Morris says "on the dandelion." Newman, "British Moths," does not commit himself as to Hectus, but of most of the others he says "on roots," but of H. Velleda he says "in thesubterraneous rhizome of the common brake, *(Pteris aquilina)*."

In spite of the very loose statements of English entomologists, I think there can be no doubt that the larvæ of this genus are internal feeders, as stated by both Harris and Packard.

*Since writing this paper Prof. J. B. Smith has called my attention to the fact that *H. McGlashani* is very abundant. See Ent. Amer., II., 15.

ON SOME UNDETERMINED BOMBYCES.

BY HARRISON G. DYAR, NEW YORK.

THIA (THELETHIA) EXTRANEA, Hy. Edw.

Mr. Andrew Bolter, of Chicago, has kindly sent me the type of this species for examination. It proves to belong to none of our families of Bombyces, as I had suspected. (See Journal N. Y. Ent. Soc., I., 98). On comparing the venation with *Pseudanaphora arcanella*, Clem.,* I find it to be essentially the same, differing only in details. Vein 2 of the secondaries is more remote from vein 3 in Thia than in Pseudanaphora, the lower fork of the discal vein ends between veins 4 and 5 instead of at origin of vein 4, and veins 5 and 6 arise from a common point instead of being well separated. Vein 8 (costal) present in both, strong, distinct, free, not 'apparently none.' On the fore-wings the venation is very similar in both. The second internal vein (submedian) is weak ; the first strongly furcate at base. All the venules free, unbranched. Subcostal vein very remote from the costa, all closely as in Pseudanaphora.

The fore-wings of this little moth are closely and heavily scaled above, glossy black ; below of a gray brown, the veins slightly discolorous, the costa and fringe black. Hind-wings nearly hyaline, with but a few scattering scales ; the fringe well developed, black.

Body parts black, the tongue pale, contrasting.

As the name Thia has been used before in entomology, the present Tineid genus may be known as *Thelethiâ*.

CISTHENE (CLEMENSIA) LACTEA, Stretch.

Mr. Beutenmüller has discovered a specimen of this species in the Edwards collection, without label. So far as I have been able to examine it, it does not violate the characters of Cisthene, but its coloration is so different from the other species of the genus that I would prefer to place it in Clemensia, with which it agrees perhaps equally well structurally.

PSEUDOPSYCHE (OEDONIA) EXIGUA, Hy. Edw.

According to the present arrangement, the synonymy of this species is as follows :—

Family, PSYCHIDÆ.

Genus, OEDONIA, *Kirby*.

*Determined by Prof. C. H. Fernald.

1893, Kirby, Cat. Lep. Het., I. 524.

|| *Pseudopsyche*, Hy. Edw.

1882, Hy. Edw., Papilio, II., 124.

O. EXIGUA, *Hy. Edwards.*

1882, Hy. Edw., Papilio, II., 125.

No characters have been published which would allow of giving the genus *Oedonia* a family location. Its reference to the Psychidæ is probably due to its colour only. The statement that the pectinations of the antennæ are furcate at the tips I am unable to verify, and I regard it as erroneous. The other characters which have been given are general ones.

I have examined Mr. Neumoegen's specimen, by the kind permission of that gentleman, and present my notes on the venation, as they may be of assistance to some one :—

Primaries.—Vein 1 free, straight, simple, not furcate at base, remote from internal margin ; median vein 4-branched, vein 2 arising beyond the middle of cell ; all the venules, veins 3 to 11 inclusive, simple, unbranched, arising independently and nearly equidistant from each other from the end of the cell. The cell is oval in shape, pointed at base. Vein 12 from the base of wing, free, about midway between the subcostal vein and costa.

Secondaries.—Three internal veins. (I am unable to make out vein 1a positively, owing to the condition of the specimen and to the fact that I cannot bleach the wing. Veins 1b and 1c are present, the latter in the normal position of the submedian fold). Median vein 4-branched, cell closed, the cross vein angulated between veins 5 and 6, with a discal fold from the angulation. Vein 6 arises half way from the angulation to the apex of cell, vein 7 from apex of cell ; vein 8 free from base, straight. The frenulum consists of a minute spine, apparently without any costal loop on primaries. The exact location of this genus I will leave to students of the Microlepidoptera. One of the type specimens is in the Edwards collection in the American Museum of Natural History, New York, the other in the collection of Mr. B. Neumoegen.

LIMACODES FERRIGERA, Walker.

Mr. A. G. Butler has very kindly sent me a good coloured figure of the type in the British Museum, and it proves to be *Adoneta spinuloides*, Clem.

GLUPHISIA SEPTENTRIONALIS, Walker.

DASYCHIRA CLANDESTINA, Walker.

Both these names refer to *G. trilineata*, Pack., and both antedate it. Mr. Butler has sent me a sketch of *septentrionalis* and notes on it, and Mr. J. A. Moffat has compared the type of *clandestina* with specimens of *trilineata*, and writes me that "it is, so far as I can make out, almost identical with what we have under the name of *Gluphisia trilineata*." The synonymy will be :—

G. SEPTENTRIONALIS, Walker.
1855, Walker, Cat. Brit. Mus., IV., 1038, *Gluphisia ?*
1882, Grote, check list, p. 18, *pr. syn. trilineata ?*
clandestina, Walker.
1861, Walker, Can. Nat. & Geol., VI., 36, *Dasychira.*
1877, Grote, Can. Ent., IX., 21, *Gluphisia.*
trilineata, Packard.
1864, Packard, Proc. Ent. Soc. Phil., III., 355.

ICHTHYURA APICALIS, Walker.

As suggested by Dr. Packard (Ent. News, IV., 79), this species proves to be *I. vau*. Mr. Butler has sent me a coloured figure of it. The name takes precedence, and we have :—

I. APICALIS, Walker.
1855, Walker, Cat. Brit. Mus., V., 1058.
vau, Fitch.
1859, Fitch, 5th Rept. Nox. Ins. N. Y., 65.
indentata, Packard.
1864, Pack., Proc. Ent. Soc. Phil., III., 352.
ornata, Grote and Robinson.
1868, G. and R., Trans. Am. Ent. Soc., II., 191.
incarcerata, Boisduval.
1868, Boisd., Am. Soc. Ent. Belg., XII., 86.

Not to mention the synonymy of the paler form.

CERTILA FLEXUOSA, Walker.

I have shown Mr. Butler's figure of this to Prof. J. B. Smith, and he feels sure that it represents *Raphia frater*. This removes the name from the list of undetermined Bombyces.

Mr. Butler deserves hearty thanks for his kindness in assisting us to determine these names.

THE MESILLA VALLEY COTTONWOOD LEAF-MINER DETERMINED.

BY C. H. TYLER TOWNSEND, KINGSTON, JAMAICA.

Among the first insects which I found upon my arrival in the Mesilla Valley of New Mexico, in March, 1891, was a small sawfly. My notes on this species were made as follows at the time :—

March, 1891.—Specimens of a small yellowish and brownish sawfly were found quite abundant flying everywhere from middle to last of March. They were not found on any plant, but their numbers make it probable that they will turn up as injurious to some plant. Det. by Dr. Riley as *Blennocampa*, nov. sp.

In an article in Zoe., vol. iii., p. 234–6, Oct., 1892, under the title of a leaf-miner of *Populus fremontii*, I described the larvæ, there supposed to be tineid, and gave an account of their great destructiveness to the foliage of these trees in the Mesilla Valley in 1891 and 1892. All attempts to breed the miner were futile.

However, in April, 1893, the trees were watched carefully during the time when the leaves were opening. The result was that on April 9th, adult sawflies were found very numerous on the cottonwoods, flying about and (apparently) ovipositing in the partially opened leaf bunches. The leaves were one-third to one-half opened at the time.

Specimens of these sawflies were captured on the spot. On being carefully compared with the specimens taken in March, 1891, which, as above mentioned, had been determined by Dr. Riley as a new species of *Blennocampa*, they were found to be the same. Dr. Riley has since expressed doubt *in litt.* that the two were the same. Though I did not breed the species, I am sure quite beyond any doubt that the sawflies caught April 9, 1893, are the adults of the leaf-miner referred to as described in *Zoe.* I am quite as certain also of the identity of these sawflies with the *Blennocampa*, n. sp., determined in 1891 by Dr. Riley.

Dr. Riley has given me *in litt.* the MS. name *Blennocampa populifoliella* to use for this species. I therefore place these notes on record, so that my stand in the matter may be known. It appears that the precise name of the cottonwood of the Mesilla Valley is *Populus fremontii*, Watson, var. *wislizeni*, Watson, as Prof. Cockerell has pointed out to me. (See Bull. 2, Forestry Division, U. S. Dept Agric., 1889, p. 188).

I should also point out that I found in New Mexico other tenthredinid (?) leaf-mining larvæ in *Populus angustifolia*, in the Canada Alamosa (see Journ. N. Y. Ent. Soc., i., No. 2), which belong to a different genus without doubt.

DESCRIPTIONS OF SOME SPECIES OF COLEOPTERA OCCURRING NEAR ALLEGHENY, HERETOFORE UNDESCRIBED.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

Preparatory to the publication of a list of the Coleoptera of this vicinity, it has been thought proper to characterize and name the following forms :—

Bembidium postfasciatum.—Coppery-bronzed, dark beneath, elytra pallid, two dark fasciæ. Head convex, impunctate, longitudinally impressed on each side between the eyes, coppery-bronzed ; antennæ with three basal joints pale, the others fuscous ; thorax quadrate, base and length equal, wider at middle, base truncate, basal striæ double, hind angles rectangular, carinate, dorsal line deep, coppery-bronzed, often tinted green in the basal impressions ; elytra pallid, silvery white in life, elongate oval, broadly deeply impressed transversely behind scutellum, deeply striate, striæ dilated before middle and coarsely punctured, punctures finer towards apex, intervals convex, third bipunctate, a broad undulated dark fascia behind middle, another before apex sometimes interrupted at the suture and sides ; underside dark, often with a greenish reflection ; legs entirely pallid. Length, .18–.21 inch. Characterized from 8 examples. Habitat : Palludial places along streams ; not common, but abundant when found. This species has been distributed as a variety of *dorsale*, Say, from which it is abundantly distinct ; in that species the head and thorax are brilliant green, the impressions of the thorax less dilated, the striæ of the elytra finer, not dilated near base and with finer punctures, the intervals flat ; the fasciæ narrower and less conspicuous, a greenish space around the scutellum and scarcely evidence of a transverse impression.

Platynus parmarginatus.—Elongate, depressed, dark above, antennæ, mouth parts, underside, epipleuræ and reflexed margins of thorax ferrugineous, with a tendency to piceous on the abdomen. Head with deep frontal impressions, a little narrower than the thorax within the marginal reflexions ; thorax quadrate, widest at middle, narrowed to apex and base by a curved line, anterior angles prominent, obtusely rounded, posterior obtuse, side-margins uniformly and widely reflexed, discal line fine not reaching base, length and greatest width equal ; elytra deeply sinuate at apex, striate, intervals convex, the third with four punctures. Length, .30–.38 inch. Characterized from 30 examples. Habitat :

Channels of spring runs on hills dry in summer; not common, but abundant when found. This has been distributed as a variety of *reflexus*, Lec., from which it is very distinct, the latter being much larger, with a more elongate and differently shaped thorax, tripunctate elytra, and piceous underside and legs. *P. cinctus* has the same form of thorax with *parmarginatus*, but the reflexed margin of the thorax is much narrower anteriorly than posteriorly; the thorax of *reflexus* is perceptibly longer, a little coarctate on the sides before base, widest one-third from apex, and may be termed lyriform.

Stenelophus humidus.—Piceous black, shining, basal joint of antennæ and feet pale. Head short, two-thirds as wide as thorax, smooth, antennæ brown except basal joint, very pilose; thorax quadrate, a little narrowed behind, sides curved, basal angles rounded, scarcely obtuse, impunctate, discal line fine, sometimes obsolete, basal impressions shallow, impunctate, often with minute rugæ, lateral edge narrowly ferrugineous; elytra with impunctate striæ, intervals scarcely convex, the third with a minute puncture at apical third, somewhat iridescent, extreme sutural and marginal edge sometimes pale; scutellar striæ at most rudimentary, frequently invisible; in the ♂, middle and anterior tarsi have the fourth joints deeply bilobed. Length, .18–.20 inch. Characterized from 15 examples. Habitat: Grassy swampy places in meadows and about springs. Abundant. Distinct from *S. plebeius*, which it closest resembles, by its smaller size, less rounded thorax, obsolete scutellar striæ, and other characters seen on comparison. This species has been distributed as Stenelophus, N. S.

Soronia substriata.—Oval, length twice the width, much depressed, pubescent, sordid, rufescent.

Head finely punctulate, a transverse row of minute tubercles and some scattering ones, antennæ brown, fourth joint scarcely shorter than third, antennal grooves nearly parallel; thorax two and one-half times wider than long, apex deeply emarginate, base truncate, sides regularly curved, incurved a little at base, side margins widely explanate and moderately reflexed, medial line indistinct, surface not indented, densely finely punctured to the extreme margin, pubescence fine and matted together on the disk with a brown indument producing a granulated appearance; elytra widest at the base, sides forming with those of the thorax, except the sinuation at base, a regular oval curve and with continuous broad reflexed margins, feebly costate or substriate, densely finely punctured, setose,

pubescence dense, very short and matted on the disk with indument, the margins translucent when cleaned; beneath shining, rufopiceous, undermargin of thorax and elytra very broad and smooth, and with the venter very densely, scarcely visibly punctate. The mentum and its appendages are different from those in the other species, but to be understood a figure is necessary; the strial arrangement is more distinct than in *undulata* or the European *grisea;* there is no appearance of maculation except from abrasion. The indument, whether natural or acquired, could probably be removed like that on *grisea* by washing with ammonia, and when cleaned the surface would be rufous. Only two examples occurred in May under maple *(acer rubrum)* bark.

Corymbites elongaticollis.—Black, sericeo-pubescent; head coarsely confluently punctured, front a little depressed, antennæ, ♂ a little longer than head and thorax, ♀ a little shorter, serrate from the second joint, 3rd scarcely longer than 4th, 11th constricted slightly near tip; thorax one-half longer than wide, not very convex, a little roundly narrowed from middle to apex, slightly constricted before the hind angles which are divaricate and carinate, obsoletely canaliculate at base or not, finely and closely punctured especially on the sides, a little shining when the pubescence is rubbed off; elytra not wider than thorax than which they are twice longer, uniformly narrowed from base, striæ of moderate depth, intervals convex and closely punctured with fine punctures causing a rugous appearance, finely sericeo-pubescent; femora and tibiæ piceous; tarsi rufescent beneath, very slender, 1st joint just perceptibly longer than 2nd, 5th as long as 3rd and 4th conjointly; abdomen sericeous, finely densely punctulate, prothorax and side pieces more coarsely. Length, .32–.45 inch. Described from six examples; not uncommon in Western Pennsylvania, and I took an example at Parry Sound, Ontario. It varies greatly in size. In the series it should be placed near *tarsalis* or *mendax*.

Hemiptychus castaneus.—Elongate-oval, widest at base of thorax and elytra, rufocastaneous, pruinosely pubescent, excessively finely punctulate; thorax at base sinuate each side of middle, obliquely truncate and separated externally from the base of the elytra by an indentation for the knees of the middle feet, external two striæ finely impressed from the middle continuously around the apex uniting with the short apical impressions of the 1st and 2nd striæ, and in two examples traceable anteriorly to the humerus, from which in one of these is an evident third

stria ending at the middle; as indistinctly punctulate below as above. Length, .05 to .08 inch. Described from 4 examples.

The pubescence is excessively fine, pruinose in appearance and lightly attached; when removed the surface seems highly polished, but with a good glass is seen to be densely punctulate. The smooth species of Hemiptychus, while readily separable by the eye, are not easily made known by description.

This species is next to *nigritulus*, the most common near Allegheny and Pittsburg. On vaccineæ and other low bushes; June, July; not abundant.

Isomira ruficollis.—Piceous black, thorax, mouth parts, tibiæ and tarsi ferrugineous. Head densely finely punctulate, transversely impressed between the antennæ, antennæ brown, one-third longer than head and thorax, in both sexes, third and fourth joints subequal, each not much longer than one of the following; thorax at extreme apex as wide as long, twice wider at base, very graduately narrowed from base to near apex and then suddenly incurved, margin exceedingly fine, base not or slightly sinuate each side of middle, hind angles slightly acute, dorsal line often scarcely evident, two or more vague discal impressions sometimes present, punctulation exceedingly fine and dense, dull from a dense microscopic pubescence; elytra at base scarcely wider than the thorax, slightly dilating to apical fourth, sutural stria not impressed before middle, 2nd not evident beyond apical 3rd and no traces of the others; closely, moderately, coarsely, uniformly punctuate over the whole surface, each puncture bearing a short inconspicuous hair, shining; underside punctulate like the upper, metasternum and side pieces more coarsely; length, .17–.21 inch. Described from eight examples.

Not rare on bushes near wet places. The elytra at full maturity are shining black, more or less brownish when immature. In some examples there is an undefined dark spot on the disk of the thorax. In this species, as well as in many other Cistelides, the antennæ differ much in length among individuals of either sex, also in the length of the joints; and the same is true in regard to the distance between the eyes; therefore, these characters are of little value for the separation of the species.

Acalles curtus.—Inflated, without erect setæ, unicoloured, cinereous. Head and beak, except at tip, finely granulato-punctate, punctures concealed by indument; thorax equally wide at apex and base where the width and length are subequal, one-fourth wider at middle, sides arcuately

rounded, disk notably depressed before the scutellum. Surface, when deprived of concealing indument, granular from the density of the punctuation, and with a polished dorsal line, elytra convex, inflated at middle, measured across the convexity as wide as long, roundly contracted from the middle to base where the width equals that of the thorax, posteriorly strongly declivous, deeply and widely striate, punctures large and distant, intervals convex and narrow with a crenate appearance; legs granulato-punctate and coated like the head and thorax. The punctures contain exceedingly short curved bristles visible only when sought for. Length, .08–.10 inch. Described from 4 examples. Easily known from all our species as yet described, by the absence of erect setæ and patches of scales on the elytra, as well as more globose form. Occurs near Allegheny, Pa., in April, about beech trees *(Fagus ferruginea)*, under stones where it has hibernated, but is not often found.

Pachybaris strigapunctus.—Bariform, black, shining, tarsi piceous. Beak polished, slender, long, arcuate; that of ♂ punctate at base and finely irregularly lineate to apex when carefully viewed; that of ♀ scarcely longer, punctate and lineate at base to the insertion of the antennæ; first joint of antennæ nearly three times longer than second, which is one-half longer than third, 3 to 7 equal in length but increasing in thickness, the 7th rather suddenly; thorax wider than long, convergent from base forward, suddenly constricted at apex for the insertion of the head, base with a long scutellar-lobe on each side of which it is slightly sinuate, finely, closely strigate in longitudinal wavy lines, scatteringly punctured especially near the apex, a fine median line from apex to scutellum; elytra a little wider than the thorax, twice longer, widest at middle, finely striate, striæ not obviously punctured, intervals flat, uniseriately punctured, each puncture containing a white scarcely projecting hair or seta; underside, pro- and meso-thorax and legs rather coarsely closely punctured, venter more finely, white setæ of the punctures more conspicuous than above; tibiæ roughly striate and punctured. The ♂ has an acute tubercle before the anterior coxæ, in one example a spine as in some *Centrinus;* the anterior coxæ are not widely separated, the prosternal cavity is well marked but not incised. Length, .12 to .15 inch. Characterized from 3 ♂ and 3 ♀ examples. Occurs in May and June on *Cratægus*, but not abundantly.

Balaninus confusor.—Form, colour and vestiture the same as in *B. nasicus.* Rostrum in both sexes thickened and punctured at base, that of

the female not exceeding three-fourths the length of the body, and the antennal scape equaling the three basal joints. Hind femur with an oblique medium-sized tooth ; claws with appendices acute. Length, .24 to .28 inch. Described from 5 ♂ and 5 ♀ examples. The foregoing characters will readily separate this species from any with which it is likely to be confused :—The oblique femoral tooth and acute claw appendix, from *B. nasicus* which it most resembles ; the longer antennal scape of the ♀ and the beak thickened and punctured at base in both sexes, from *B. uniformis ;* the acute claw appendices, denser vestiture and *nasicus* shape, from *obtusus.* Abundant in western and south-eastern Pennyslvania, West Virginia, south-eastern Ohio, Massachusetts, and North Carolina. Blanchard. For further comparative characters, see CAN. ENT., xxii., 7.

I have obtained this species from the acorns of *Quercus ilicifolia*, but it probably depredates on the fruit of other species of oak. An example was also obtained from one of the large apple-galls of *Solidago nemoralis;* these galls are composed of a compact porous mass caused by the larva of a fly named by Fitch *Acinia solidaginis* (Rep. 1st). The gall contained three coleopterous larvæ after the fly escaped, one of which developed the next year and turned out to be this species. Oviposition on this gall can scarcely have been otherwise than a mistake on the part of the parent.

NOTES AND QUERIES.

BY REV. W. J. HOLLAND, PH. D., ALLEGHENY, PA.

I have just received a specimen of an Erebus odora, which was captured last Wednesday evening (Sept. 27th) in the lecture-room of the First United Presbyterian Church, in the city of Allegheny, where its appearance caused no little consternation among the devout " mothers in Israel " who were at prayer meeting, and who thought it was a bat, of which evil things are said by the unsophisticated. It is a male in good case. This is the third specimen I have received this summer. The first was taken about four weeks ago in the cellar of my father's residence in Bartholomew County, Indiana. The second was taken at Jeannette, Pa., near a spring-house. All three specimens are fresh in appearance, as if not long from the chrysalis. Undoubtedly this great moth is more than an occasional visitor from the tropics, and should be reckoned as belonging to our fauna, though scarce. Its capture has been recorded north of the Ohio and Potomac many scores of times, and it has been taken repeatedly in Canada.

Papilio Cresphontes, for the first time, has been taken this summer in the neighborhood of Pittsburgh, and in considerable numbers. One collector obtained four specimens in one locality. The food-plant is Zanthoxylum and Ptelea in these parts. In Florida its larva is abundant upon the orange and lemon trees.

One of the commonest of our Papilios is Philenor. Here its larva is found upon Aristolochia. In southern Indiana, in Bartholomew county, I have observed it summer after summer, sometimes in immense numbers. It is one of the commonest butterflies there, as here. But, with the exception of one or two specimens of Aristolochia growing about verandahs in the village of Hope, I think I may safely say there is not a plant of Aristolochia within many miles of the fields in which I have counted the perfect insects by the score. What is the other food plant upon which the larva feeds? It runs in my mind that I have read that the caterpillar has been found upon the smart-weed (*Polygonum hydropiper*), but I cannot recall where I have seen this statement made. I have never been able to verify it by observation. Perhaps some reader of the CANADIAN ENTOMOLOGIST may be able to throw light upon the subject.

The banana merchants in our town have proved themselves possessed of curious entomological stores. I have received from them a couple of living tarantulas, and not long ago a living specimen of Caligo Teucer, which had emerged from a chrysalis hidden in a bunch of bananas. The insect had been transported by sea and land from either Honduras or some port in the northern portion of South America, a journey of several thousand miles. This reminds me that in several consignments of eastern Lepidoptera I have found our Danais plexippus, Linn. One of the sendings was from Borneo, the other from Java. We shall soon hear of its domestication on the mainland of Asia, and it will probably spread all over China and Japan. The insects taken by the U. S. Eclipse Expedition of 1889, at the Azores, numbered among them two specimens of this butterfly. There were only about a dozen specimens of insects taken at the Azores by the industrious? naturalists of the party, and I judge that it must be common there. Why we have not yet heard of its domiciliation on the African continent is a mystery to me. It will no doubt get there before long.

I have a specimen of Limenitis taken in Warren county, Pa., this summer, which is most remarkable. It has all the markings of L. ursula,

but both the primaries and secondaries are crossed by very broad, white bands, as in L. arthemis. It is, however, larger than any specimens of Arthemis I have ever seen, and exceeds the majority of L. ursula in size. It has the white spots in the cell of the primaries which appear in some female specimens of L. Weidemeyeri. It is altogether a queer beast combining the characteristics of three of our species. No doubt they all sprang from a common ancestry, and this specimen reveals the force of atavism.

EXOCHILUM MUNDUM, SAY, ATTACKING THE FALL WEB-WORM.

BY A. H. KIRKLAND, ASSISTANT IN THE AMHERST, MASS., INSECTARY.

One hot afternoon in the early part of August, 1893, while out collecting, I found a large web of the Fall Web-Worm (*Hyphantria cunea*, Drury), on a young apple tree. Reaching up to cut off the twigs to which the web was attached, my attention was attracted by an unusual disturbance among the inmates of the web. Closer inspection revealed the fact that a medium-sized Ichneumon fly had intruded within the family circle, and was proving herself a most unwelcome visitor. Tearing into the web with her feet she would force her way along until she arrived under the skeletonized leaves upon which the larvæ were resting and through which they were plainly visible. When her presence was noticed by the larvæ lying on a large leaf nearest the intruder, they raised their heads and swung them rapidly from side to side, and at the same time each one emitted a drop of greenish fluid from its mouth. Meanwhile the Ichneumonid had crept up under the leaf, and bending the posterior segments of her abdomen until the partly exserted ovipositor extended forward between the feet and beyond the head, she poised herself for a moment as if to take aim, then with lightning rapidity she darted her abdomen and ovipositor still farther forward and struck through the leaf into the body of a larva, which at once commenced to writhe and twist as if in great pain. I watched this operation continue for about half an hour and did not observe the Ichneumonid sting any larva more than three or four times, usually but once.

Upon attempting its capture it broke out of the web and flew off. Soon, however, it returned, and after circling about for a short time as if to select a favorable place for renewing operations, it alighted and again forced an entrance into the web. This time my efforts were successful, and my capture, as kindly determined by Prof. Fernald, proved to be *Exochilum mundum*, Say. The larvæ that had been stung were brought to the Insectary for the purpose of obtaining more specimens of this interesting Ichneumonid.

NORTH AMERICAN THYSANURA—IV.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

Most modern European writers follow Tulleburg in placing all the Collembola in the family *Poduridæ*, and including the *Poduridæ*, *Lipuridæ* and *Anouridæ* of Lubbock in the subfamily *Lipurinæ*. It would seem more natural to restrict the name *Poduridæ* to those genera bearing the saltatory apparatus on the antepenultimate abdominal segment, instead of the penultimate, and then to include those genera in which the saltatorial apparatus is wanting under the name *Aphoruridæ*.*

APHORURIDÆ, nom. nov.

Body naked, generally small; antennæ four-jointed; ocelli present or absent; postantennal organ usually present; tarsi with one or two claws; furcula wanting.

The genera belonging to this family can be readily separated by means of the following table:—

A. Mouth parts not produced cone-like beneath the head.
  B. Tarsi with two distinct claws ..... *Aphorura.*
  BB. Tarsi with a single stout claw.
    C. Postantennal organ wanting ..... *Bourletia.*
    CC. Postantennal organ present.
      D. Anal spines present; postantennal organ transverse ..... *Tullbergia.*
      DD. Anal spines wanting; postantennal organ circular ..... *Anurida.*
AA. Mouth parts produced cone-like beneath the head.
  B. Ocelli present, three on each side of the head ..... *Neanura.*
  BB. Ocelli wanting ..... *Aphoromma.*

Aphorura,† gen. nov.—Ocelli wanting; antennæ four-jointed; postantennal organ present; ocellate punctures at base of the antennæ present; lower claw of tarsi distinct. Type, *Podura ambulans*, Linn.

Proposed for Lipura, Burm., which is preoccupied in Mammology.

Bourletia, gen. nov.—Ocelli sixteen, eight on each side of the head; antennæ four-jointed; ocellate punctures, postantennal organ, anal spines and lower tarsal claw wanting. Type, *Anurophorus laricis*, Nic.

**Lipura* and *Anura* are both preoccupied in zoology.

†α, priv.; φορός, ferens; οὐρά, cauda.

Tullberg uses *Anurophorus*, Nic., for this species, but both *Anurophorus* and *Adicranus*, Bourl., have *Podura fimetaria*, Linn., as type, which belongs to *Lipura*, Burm. The genus is named for the Abbe Bourlet, a well-known writer on Thysanura.

Tullbergia, Lubbock.—Ocelli wanting; antennæ four-jointed; postantennal organ present; lower claw of tarsi wanting; anal spines large, stout; body elongate. Type, *Tullbergia antarctica*, Lub.

Anurida, Laboulb.—Ocelli ten, five on each side of the head; antennæ four-jointed; postantennal organ present; ocellate punctures, lower claw of tarsi, and anal spines wanting. Type, *Achorutes maritimus*, Guer.

Anurida maritima, Guer.—Body plumbeous, sparsely covered with long hairs; head triangular, produced between the antennæ, broadly truncate in front, broadly emarginate behind; antennæ shorter than the head, basal segment large, globular, one-half broader than the other segments, second segment a little longer than the first, the third and fourth closely joined, as long as the first and second together; eyes five, two in front and three behind; postantennal organ with seven prominences, arranged in the form of a circle; legs short and stout, covered with long stiff bristles; claws long, blunt, one-half the length of the tibia. Length, 3 mm.

Habitat: Eastern coast of the United States, Europe.

Neanura, gen. nov.—Ocelli six, three on each side of the head; antennæ four-jointed; postantennal organ present or wanting; ocellate punctures, anal spines, and lower claw of tarsi wanting; mouth parts produced cone-like beneath the head. Type, *Achorutes muscorum*, Temp.

Proposed for *Anoura*, Gerv., which is preoccupied in Mammology.

Aphoromma,‡ gen. nov.—Ocelli wanting; antennæ four-jointed; postantennal organ present; ocellate punctures, anal spines, and lower claw of tarsi wanting; mouth parts produced cone-like beneath the head. Type, *Anoura granaria*, Nic.

PODURIDÆ.

Body cylindrical, naked, usually small; antennæ four or five-jointed; eyes present, with ten to thirty ocelli; postantennal organs usually wanting; tarsi with one or two claws; furcula present, attached to the fourth abdominal segment.

‡*α*, priv.; *φορός*, ferens; *ὄμμα*, oculus.

The genera belonging to this family, as restricted above, can be separated as follows :—

A. Mouth parts not produced cone-like in front of the head.
  B. Antennæ four-jointed.
    C. Tarsi with two claws.
      D. Abdomen without anal spines.....*Achorutes.*
      DD. Abdomen with anal spines.
        E. Abdomen with two anal spines.....*Schoturus.*
        EE. Abdomen with four anal spines...*Tetracanthella.*
  CC. Tarsi with a single claw.
    D. Ocelli twenty-eight or thirty, fourteen or fifteen on each side of the head ; anal spines wanting.....*Podurhippus.*
    DD. Ocelli less than twenty-eight.
      E. Anal spines wanting.
        F. Furcula long, reaching beyond the apex of the abdomen, arcuate.....*Podura.*
        FF. Furcula short, never extending beyond the apex of the abdomen, not arcuate.
          G. Legs long, distinctly visible from above.....*Pseudachorutes.*
          GG. Legs extremely short, not visible from above.....*Brachysius.*
      EE. Anal spines present.
        F. With two anal spines.....*Xenylla.*
        FF. With more than two anal spines.
          G. With three anal spines.....*Triæna.*
          GG. With four anal spines .....*Oudemansia.*
  BB. Antennæ five-jointed.....*Lubbockia.*
AA. Mouth parts produced cone-like in front of the head.*Gnathocephalus.*

Achorutes, Temp.—Ocelli sixteen, eight on each side of the head ; postantennal organ wanting ; antennæ short, four-jointed ; body cylindrical, segments sub-equal ; tarsi with two claws ; anal spines wanting. Type, *Achorutes dubius*, Temp.

Achorutes longispinus, sp. nov.—Body cylindrical, purplish-black, hairy ; head large, rounded in front, truncate behind, prolonged between the antennæ, acutely triangular ; eyes on a small black patch almost directly behind the antennæ in the middle of each lateral half of the head ; antennæ about as long as the head, basal joint globular, minute, incon-

spicuous, set in an excavation beneath the frontal projection, second and third joints subequal, globular, fourth joint elongate, as long or longer than the three basal joints, cylindrical, pointed, the inner side at apex appearing truncated; legs stout; claws large, inner claw more than half the length of outer, outer with a denticle at base; furcula elongate, reaching the hind pair of legs; manubrium large, reaching beyond the apex of the abdomen, sides straight, sub-parallel; dentes elongate, as long as the manubrium, broadest at middle, underside with two or three rows of stiff spines; mucrones short, not longer than broad, with an apical and a preapical tooth. Length, 1–1.25 mm.

Habitat: Alameda, near Las Cruces, New Mexico.

Received from Mr. Theo. D. A. Cockerell, who had received them from Mr. E. VanPatten, "who found them in immense numbers at Alameda."

Schoturus,‖ gen. nov.—Ocelli sixteen, eight on eaeh side of the head; postantennal organ wanting; antennæ short, four jointed; body cylindrical, segments sub-equal; tarsi with two claws; anal spines present, two. Type, *Podura nivicola*, Fitch.

This genus is proposed for those species at present placed in the genus *Achorutes* and which have anal spines.

Tetracanthella, Schott.—Ocelli sixteen, eight on each side of the head; postantennal organ present; antennæ four-jointed; tarsi with two claws; anal spines present, four, arranged in two rows; furcula short. Type, *Tetracanthella pilosa*, Schott.

Entom., Tidsk., XII., 1891, 191; fig.

Podurhippus, Megnin.—Ocelli twenty-eight or thirty, fourteen or fifteen on each side of the head; antennæ four-jointed; tarsi with a single claw; furcula short, slender; ventral tube tuberculate, bilobed. Type, *Podurhippus pityriasious*, Megnin.

Bull. Soc. Ent. Fr. (5), VIII., 1878, p. cxxxv.; Les Parasites, 1880, p. 104; fig. 42.

Podura Linn.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ four-jointed; tarsi with a single claw; furcula long, slender, arcuate; anal spines wanting. Type, *Podura aquatica*, Linn.

Podura granulata, sp. nov.—Body, legs and antennæ bluish-black;

‖σχότος, obscurus; οὐρά, cauda.

antennæ long and slender, longer than the head; head with a quadrangular tubercle between the eyes; thorax slender, much narrower than the head; legs short and stout; claws long and slender, as long as the tibia and tarsus together; tenant hair present; furcula long and slender, reaching the first pair of legs, densely covered with closely placed, blunt, spiny tubercles, the tubercles arranged in transverse rows around the spring, giving the spring a striated appearance with a low objective; manubrium short and stout, apex produced between the dentes broadly triangular; dentes long, slender, a few scattered hairs, and indications of a transverse suture at middle; mucrones short, pointed, with a triangular tooth at base. Length, 1.25 mm.

Habitat: Tennessee.

Collected in great numbers by Prof. H. E. Summers from the surface of thin, slimy mud.

Pseudachorutes, Tullb.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ conical, four-jointed; tarsi with a single claw; furcula short, reaching the apex of the abdomen; anal spines wanting. Type, *Pseudachorutes subcrassus*, Tullb.

Brachysius,§ nov. gen.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, not longer than the head is broad, four-jointed; tarsi with a single claw; furcula short, not reaching the apex of the abdomen nor the ventral tube; anal spines wanting; legs short and stout, not reaching the side of the body. Type, *Brachysius dilatatus*, sp. nov.

Brachysius dilatatus, sp. nov.—Bluish mottled with gray; antennæ short, not much longer than the head, first joint very small, second and third subequal, fourth almost as long as second and third together; body long and slender, broader towards the caudal end; legs short and slender, not extending beyond the side of the body; furcula short and slender; anal papillæ small, not divided, covered with stiff bristles. Length, 2 mm.

Habitat: Ithaca, N. Y.

This species has the habitus of those of the genus *Neanura*, but can be readily distinguished by the number of ocelli and by the presence of the furcula.

Xenylla, Tullb.—Ocelli ten, five on each side of the head; postantennal organ wanting; antennæ four-jointed; body cylindrical; tarsi with a single claw; anal spines present, two. Type, *Xenylla maritima*, Tullb.

§βραχύς, brevis; ὐσσός, jaculum.

Triæna, Tullb.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ four-jointed, conical; tarsi with a single claw; furcula extremely small, papilliform; anal spines present, three. Type, *Triæna mirabilis*, Tullb.

Oudemansia, Schott.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, four-jointed; body cylindrical, segments subequal; tarsi with two claws; anal spines present, four, arranged in a circle around the apex of the abdomen; furcula not attaining the ventral tube. Type, *Oudemansia cærulea*, Schott.

Entom. Tids., XIV., 1893, 174; pl., II., 1–7.

Lubbockia, Haller.—Antennæ five-jointed, longer than the body; all the tarsi with tenant hairs, small on the front and middle pairs; anal spines present, two; furcula small; body cylindrical, segments subequal. Type, *Lubbockia cærulea*, Haller.

Mittheil. Schweiz. Entom. Ges., VI., 1880, 4.

Gnathocephalus,* gen. nov.—Ocelli sixteen, eight on each side of the head; postantennal organ wanting; antennæ short, conical, four-jointed; body cylindrical; tarsi with a single claw; anal spines wanting: furcula short, not attaining the ventral tube; mouth-parts folded together in the form of a tube and projecting in front of the head. *Gnathocephalus complexus*, sp. nov.

Gnathocephalus complexus, sp. nov.—Body robust, broadest behind, bluish-black, a row of paler spots down each side, and a few scattered hairs on the caudal end; head small, triangular, strongly produced between the antennæ, broadly truncate in front; eye spot small, on a raised tubercle; antennæ slightly longer than the head, basal segment a little longer than broad, broadest at middle, second segment as broad as the first and slightly shorter; third and fourth segments sub-equal, longer than the first and second, and much narrower, the suture between them not distinctly indicated; legs long and slender, with lighter markings and scattered regularly placed bristles; tenant hairs wanting; claws stout; furcula short, stout; manubrium half as broad as the abdomen, nearly as broad as long, slightly incised between the dentes; dentes two-thirds the length of the manubrium, cylindrical, narrowed at apex; mucrones one-half the length of the dentes, slightly arcuate, without teeth. Length, 3–4 mm.

Habitat: Olympia, Washington. (Trevor Kincaid, collector.)

*Γνάθος, maxilla; Κέφαλὸς, caput.

ON THE EUDRIINÆ.

BY A. R. GROTE, A. M., BREMEN, GERMANY.

In an original memoir on the *Zygaenidæ*, published by the Essex Institute, Dr. Packard explained the relation of *Castnia* and allied genera to the European genus *Zygaena*, and contended for the solidarity of the group as the equivalent of the large family of *Bombycidæ* in the Latreillean sense. The view, advocated by Agassiz, that *form* was a family criterion, not only form in general, but form of parts underlying form in general, obtained. Of a truth Dr. Packard's "family," *Zygaenidæ*, contained genera more or less evidently related in one or other of their stages, and the agreement which Dr. Packard found in the form of the clypeus authorized their being brought together in a family group. This view has been followed by me in my papers and lists, and any adverse criticism of my particular course with regard to these insects is consequently ill-founded; while the inherent want of precision which our classifications must present allows of a shifting opinion, within limits, as this or that character appears in turn to be the decisive one, and renders such criticism unnecessary. The tendency of classificators latterly has turned in the direction of a breaking up of these "families" into smaller groups still called "families," but based rather upon ultimate peculiarity than "form." Under the vague term "Bombyces," the various new families of the Spinner moths are still kept together, in recognition of a less tangible relationship which nevertheless is still held to exist; while the view, that the present representation of these families is the modified survival of the roots of the lepidopterous tree, is being seriously considered by students of phylogeny. Classificators of the lepidoptera who seize only upon ultimate peculiarities of a common and essential part of the perfect insect, will, in the nature of things, eventually come to grief. Such modifications we may use to separate species, and, when so evident as to be of practical service, in the more artificial region of generic division; but, as we ascend higher, they diminish in importance and are superseded by characters of development, persistent or evanescent, offered in different stages of growth of the species. By these characters indications as to the truer affinities of the insect are given. The time is perhaps going by when lepidoptera are to be solely classified by final peculiarities of the legs, wings or tails of the perfect insect. Still, there will always be those whose observations in these directions will seem to themselves of prime importance, while, in the end, the value

of their observations will be differently expressed in our classifications. The family "*Zygaenidæ*" has shared the fate of disintegration with the family "Bombycidæ." Dr. Packard now recognizes three family groups: *Agaristidæ*, *Castniidæ* and *Zygaenidæ*. The sub-family *Eudriinæ*, as I would consider it, the subject of the present notice, belongs, with the sub-family *Alypiinæ*, to the *Agaristidæ*. The present sub-family seems to be exclusively American; at least I have met in literature with but one extra limital form, the African genus *Ovios*, which may possibly belong here. The general form of the perfect insect recalls that of the *Noctuidæ*, so that Hübner considers it one, while Boisduval proposes the genus *Eudryas* for the typical generic group and apparently recognizes its structural affinities to *Castnia*. The larva, as we now know, is closely allied to that of *Alypia*. The genera of the *Eudriinæ* may be briefly distinguished as follows:—

1. Structure of the male wings normal,	2.
Structure of the male wings abnormal.	*Euscirrhopterus*, *Grt.*
2. Male antennæ simple,	3.
Male antennæ pectinate.	*Ciris*, Grt.
3. Front smooth.	*Eudryas*, Boisd.
Front horned.	*Copidryas*, Grt.

With regard to the geographical distribution *Eudryas* occurs in North America (east and west coast), and in South America (Paraguay). *Copidryas* in North America (New Mexico, Texas) and in South America.* (? Buenos Ayres). *Euscirrhopterus* is Cuban and *Ciris* is from Texas. With regard to the species, it is not entirely impossible that Walker's type of *Eudryas Stæ. Johannis* represents a Florida species else unknown. It is pronounced by Prof. Smith to be an aberration of *E. grata*, and its divergence from the type to have been probably produced by the "vicissitudes of the voyage." The former statement may not improbably be the true solution of the matter, since so prominent an insect should have been turned up by collectors in Florida ere this, one might think. But the cause assigned for such an aberration I am unable to follow, or even to understand. What is meant by "vicissitudes of the voyage?" The pupa (?) could not have suffered shipwreck or been washed ashore! What records are there in literature of extraordinary variations being produced through ordinary transportation by sea? The chances against the

*See Papilio 3, 106. Berg's *Platensis*, as I understand his remark as to the front, probably belongs to *Copidryas*.

unprotected survival during the voyage, that this pupa should produce an unique variety, the capture of the perfect moth on a Church step in England, its delivery at the British Museum, taken altogther seem enormous. The fact that the hind-wings are unbanded is paralleled in the case of a new species from South America, which I describe here. According to Mr. Tutt's kind communication: There is a place in Southwark, one of the London districts close by London Bridge, called "Horselydown," and there is a church there called St. John's. As this is very near the river an imported insect might be found there if we suppose it to escape from the shipping on the Thames. But there is also a place called "Horsley" in Surrey, and there are some well-known "Downs" there which have been entomologically worked over from a long period. But there is no St. John's Church there, and under the theory that Walker named the insect from the Church in England, and not, as I had imagined possible, from the St. John's River, Florida, where Doubleday collected, the Surrey locality must be abandoned. We are, therefore, driven to the conclusion that if the label is genuine, the specimen was really captured at "Horselydown," and that "Horsley Downs" is a mistake for the former on the label. If a normal specimen of *Eudryas grata* had been stated to have been caught in England, while still extraordinary, there would have been nothing so very improbable in the fact, since, according to Wood and other English authors, *Drasteria*, *Eustrotia* and other American moths have been so taken (?); I myself took a specimen of a South American species of Noctuidæ on the Battery in New York. But that this particular specimen should belong also to a very remarkable variety, never observed in America, increases the chances against the story (which may nevertheless be a true one) enormously. *Eudryas*, we may concede, might stand the voyage as a pupa and also escape as a moth in London, but how a *Stæ. Johannis* could have been turned out of a *grata* caterpillar or pupa owing to the "vicissitudes of the voyage" I do not comprehend. The type which I saw in 1868 differed not only from *grata* in its unbanded secondaries, but also by its differently coloured and perhaps marked primaries. While I recognized it as allied to *grata*, I could not help supposing it a distinct species, since I had never known *grata* to vary in that manner. In fact, that it might be a variety did not, I think, occur to me. I did not visit the Museum for the express purpose of studying *Stæ. Johannis*. I took it in rapidly and saw that it was an *Eudryas* and differed from both our common species, *grata* and *unio*, and simply re-

corded the fact that it impressed me as a distinct and even larger species. It may be that we are already in possession of the final solution of this little entomological mystery, and that *Stæ. Johannis* is really an extraordinary variation of *grata*, captured on the Church door of St. John's, in Horselydown, London, England. But it will nevertheless remain an interesting subject until we find specimens in America of the aberration, which ought to occur there also, or until we send *grata* pupa across the Atlantic and observe the effects of the "vicissitudes of the voyage." If any of these latter evolve as *Stæ. Johannis*, the mystery would be solved, and an important phase in the general subject of variation opened up. But I cannot think it. The aberration, if one, must have a cause independent of the mere voyage. Moisture, temperature, might possibly darken the primaries, but how are we to account for the secondaries, which so far from being "suffused," have no band at all, the usual ground colour obtaining over the whole surface? Here is a specimen which on the fore-wings is to show the effects of melanism, and on the hind-wings of albinism. The type of *Stæ. Johannis* is, under the circumstances, one of the most extraordinary specimens, I think, in the British Museum collection, whatever view we take of the matter, and the question before the American collector now is the range of variability in *E. grata*, and whether this shows any steps in the direction of a darkening of the fore-wings and obliteration of the marginal band on secondaries. Thus, quite independent of mere controversy as to the origin of the type, the subject is eminently one for scientific enquiry and experiment.

Eudryas Cypris, n. s.

The hind-wings with the fringes are pale vermillion-red above and below, immaculate, without band or markings. Fore-wings beneath of the same red, immaculate. Above the fore-wings have the main central portion creamy, not pure white as in allies, shading inferiorly to ochrey-olivaceous, and there is an olivaceous shade patch over the median nervules edged outwardly narrowly with whitish and deepening in colour inferiorly. A brownish terminal band, best marked superiorly on costa, and showing a lilac reflection. From opposite the cell to anal angle this band is indented by the pale red terminal edge of the wing. The somewhat olivaceous fringes show a darker median line. The costal edge towards apices is faintly red. The costal and internal shading recalls *grata*, but there is less trace of the reniform than in the N. American form; in *cypris* the traces of the reniform (perhaps variable) are fragment-

ary, as in *unio*. Abdomen red on the sides; venter pale. Antennæ simple. Front not tuberculate. One female from Assumption (So. America, coll. Consul Mangels) in Mus. Bremen.

This species is perhaps a little smaller than *grata*, very different from both N. American species by the darker creamy shade, not white, of the median field of primaries, by the red colour of hind-wings and under-surface, by the red abdomen and unbanded secondaries. It is, in shape of primaries and in their style of ornamentation, nearer *grata* than *unio*. The discovery of a South American representative of *grata*, with unbanded secondaries, is interesting. The latter character is only found in *E. Stae. Johannis*, where the yellow hind-wings are without band. Although on this account alone the specific value of the latter may not be adequately defended, yet the probabilities in favour of this view may be considered to become somewhat heightened in view of the discovery of the South American species. The terminal bands of the hind-wings in *grata* and *unio* are decidedly characteristic, and one is unprepared for their absence in *Stae. Johannis*, unwilling to consider so marked a modification merely varietal.

The following is a list of the *Eudriinæ*:—**

Eudryas, Boisd.

1. unio, *Hübn.*
   var. brevipennis, *Stretch.*
2. grata, *Fabr.*
   assimilis, Boisd.
   ab? Stræ. Johannis, *Walk.*
3. Cypris, *Grt.*
   Ciris, Grt.
4. Wilsoni, *Grt.*

Copidryas, Grt.

5. Gloveri, *G. & R.*
6. platensis, *Berg.*

Euscirrhopterus, Grt.

7. Poeyi, *Grt.*
   disparilis, H.–S.

The North American *Agaristidæ* apparently fall into two sub-families, the *Eudriinæ*, above catalogued, and the *Alypiinæ*, containing *Alypia*, *Androloma*, *Pseudalypia*, *Edwardsia*, and *Psychomorpha*. The *Castniidæ* are apparently not represented in the North American fauna. The *Zygænidæ* are now restricted by Dr. Packard so as to include *Horama*, *Burtia* and allies, with *Ctenucha* and *Scepsis* in one sub-family group, while *Procris*, *Harrisina* and their allies fall into the typical sub-family, being more intimately related with the European *Zygæna*, a genus not represented with us. From this it will appear that a belief in the stability of the rearrangement of the *Zygænidæ* in the Philadelphia List will probably prove illusory. The genus *Oeta*, Grt., should be removed to the *Tineidæ*, as indicated by Zeller.

**For a list of our species consult also Papilio I., 177. I have never seen a Californian specimen, and am quite doubtful as to *brevipennis* being a variety of *unio*. Stretch's figure and description were made from an imperfect example. The Cuban *E. Poeyi* was subsequently described by Herrick-Schaeffer as *Heterandra disparilis*; on comparison of the dates of issue of the two publications, which appeared nearly at the same time, the Philadelphia paper has priority.

LIST OF COLEOPTERA TAKEN AT SPARROW LAKE, ONT.

BY JOHN HAMILTON, M. D., ALLEGHENY, PA.

[In our last number, pages 272–5, the lists of Coleoptera were unfortunately disarranged in making up the forms. We accordingly reprint them in their proper order.—Ed. C. E.]

Cicindela repanda, *Dej.*
var. 12-guttata, *Dej.*
Cychrus Lecontei, *Dej.*
Carabus sylvosus, *Say.*
Calosoma scrutator, *Fab.*
Wilcoxi, *Lec.*
calidum, *Fab.*
Elaphrus ruscarius, *Say.*
Loricera cærulescens, *Linn.*
Nebria pallipes, *Say.*
Scarites subterraneus, *Fab.*
Dyschirius nigripes, *Lec.*
Bembidium patruele, *Dej.*
versicolor, *Lec.*
Sp. undetermined.
Tachys nanus, *Gyll.*
flavicauda, *Say.*
Patrobus longicornis, *Say.*
Pterostichus honestus, *Say.*
coracinus, *Newm.*
stygicus, *Say.*
lucublandus, *Say.*
caudicalis, *Say.*
luctuosus, *Dej.*
corvinus, *Dej.*
erythropus, *Dej.*
Amara exarata, *Dej.*
pallipes, *Kirby.*
rubrica, *Hald.*
Calathus gregarius, *Say.*
Platynus sinuatus, *Dej.*
extensicollis, *Say.*
atratus, *Lec.*
Platynus melanarius, *Dej.*
corvus, *Lec.*
placidus, *Say.*
Bogemanni. *Gyll.*
ruficornis, *Lec.*
Galerita janus, *Fab.*
Lebia viridis, *Say.*
Metabletus americanus, *Dej.*
Cymindis pilosa, *Say.*
Brachynus cyanipennis, *Say.*
Chlænius sericeus, *Forst.*
pennsylvanicus, *Say.*
Anomoglossus emarginatus, *Say.*
Brachylobus lithophilus, *Say.*
Agonoderus pallipes, *Fab.*
Harpalus erraticus, *Say.*
viridiæneus, *Beauv.*
Sp. undetermined.
pennsylvanicus, *De G.*
fallax, *Lec.*
pleuriticus, *Kirby.*
viduus, *Lec.*
Stenolophus plebeius, *Dej.*
conjunctus, *Say.*
Anisodactylus Harrisii, *Lec.*
interstitialis, *Say.*
Ilybius biguttatus, *Germ.*
Hydaticus stagnalis, *Fab.*
Dytiscus fasciventris, *Say.*
Gyrinus canadensis, *Reg.* ?
analis, *Say.*
Berosus striatus, *Say.*
Philydrus perplexus, *Lec.*

Hydrobius fuscipes, *Linn.*
Creniphilus sub-cupreus, *Say.*
Cercyon pygmæum, *Ill.*
Necrophorus vespilloides, *Hbst.*
Silpha Americana, *Linn.*
Liodes discolor, *Mels.*
Homalota trimaculata, *Er.*
Bolitochara picta, *Fauv.*
Aleochara bimaculata, *Grav.*
graciliformis, *Fauv.*
Gyrophæna vinula, *Er.*
Quedius fulgidus, *Fab.*
lævigatus, *Gyll.*
Listotrophus cingulatus, *Grav.*
Creophilus maxillosus, *Linn.*
Staphylinus violaceus, *Grav.*
Philonthus politus, *Linn.*
longicornis, *Steph.*
micans, *Grav.*
cyanipennis, *Fab.*
sordidus, *Grav.*
Sp. undetermined.
Xantholinus obsidianus, *Mels.*
emmesus, *Grav.*
obscurus, *Er.*
N. S. (found here).
Baptolinus longiceps, *Fauv.*
Stenus—3 sp.
Lathrobium punctulatum, *Lec.*
bicolor, *Lec.*
Stilicus, sp.
Pæderus littorarius, *Grav.*
Sunius longiusculus, *Mann.*
Tachinus repandus, *Horn.*
fimbriatus, *Grav.*
Erchomus ventriculus, *Say.*
Conosoma pubescens, *Payk.*
Boletobius cincticollis, *Say.*
Olisthærus substriatus, *Gyll.*
Oxyporus femoralis, *Grav.*
rufipennis, *Lec.*
Oxytelus sculptus, *Grav.*
pennsylvanicus, *Er.*
insignitus, *Grav.*
Trogophlœus 4-punctatus, *Say.*
Scaphisoma convexum, *Say.*
Hippodamia 13-punctata, *Linn.*
Coccinella trifasciata, *Linn.*
Chilocorus bivulnerus, *Muls.*
Psyllobora 20-maculata, *Say.*
Hyperaspis signata, *Oliv.*
Scymnus lacustris, *Lec.*
Endomychus biguttatus, *Say.*
Tritoma thoracica, *Say.*
Silvanus bidentatus, *Fab.*
Læmophlæus fasciatus, *Mels.*
Hister depurator, *Say.*
sedecimstriatus, *Say.*
carolinus, *Payk.*
Lecontei, *Mars.*
Epuræa Erichsonii, *Reit.*
Sp.
Ips fasciatus, *Oliv.*
Stephostethus liratus, *Lec.*
Corticaria pusilla, *Mann.*
pumila. *Lec.*
Tenebrioides corticalis, *Mels.*
Cyphon obscurus, *Guer.*
Deltometopus amœnicornis, *Say.*
Dromaeolus Harringtoni, *Horn.*
Alaus myops, *Fab.*
Agriotes fucosus, *Lec.*
Sp.
Melanotus castanipes, *Payk.*
fissilis, *Say.*
Corymbites medianus, *Germ.*

Cormybites propola, *Lec.*
Dicerca tuberculata, *Chev.*
Sp. undetermined.
Buprestis rusticorum, *Kirby.*
fasciata, *Fab.*
Agrilus ruficollis, *Fab.*
Calopteron terminale, *Say.*
Calochromus perfaceta, *Say.*
Ellychnia corusca, *Linn.*
Telephorus lineola, *Fab.*
scitulus, *Say.*
Collops tricolor, *Say.*
Trichodes Nuttalli, *Kirby.*
Hydnocera pallipennis, *Say.*
longicollis, *Zieg.*
Cis fuscipes, *Mellie.*
Canthon lævis, *Drury.*
Onthophagus Hecate, *Panz.*
Dialytes striatulus, *Say.*
Ulkei, *Horn.*
Aphodius fossor, *Linn.*
fimetarius, *Linn.*
ruricola, *Mels.*
leopardus, *Horn.*
lentus, *Horn.*
Geotrupes splendidus, *Fab.*
Anomala lucicola, *Fab.*
Ligyrus relictus, *Say.*
Euphoria fulgida, *Fab.*
Osmoderma scabra, *Beauv.*
Trichius affinis, *Gory.*
Valgus canaliculatus, *Fab.*
Hylotrupes bajulus, *Linn.*
ligneus, *Fab.*
Calloides nobilis, *Say.*
Arhopalus fulminans, *Fab.*
Xylotrechus sagittatus, *Germ.*
Clytanthus ruricola, *Oliv.*
Euderces picipes, *Fab.*
Desmocerus palliatus, *Forst.*
Centrodera decolorata, *Harr.*
Gaurotes cyanipennis, *Say.*
Typocerus sparsus, *Lec.*
velutinus, *Oliv.*
Leptura nitens, *Forst.*
canadensis, *Oliv.*
vagans (var. brevis, *Kirby*)
Monohammus confusor, *Kirby.*
Urographis fasciatus, *De G.*
Saperda vestita, *Say.*
3-dentata, *Oliv.*
Amphionycha flammata, *Newm.*
Donacia palmata, *Oliv.*
piscatrix, *Lac.*
proxima, *Kirby.*
2 sp. not determined.
Pachybrachys femoratus, *Oliv.*
hepaticus, *Mels.*
Monachus saponatus, *Fab.*
Diachus auratus, *Fab.*
Adoxus obscurus (var. vitis, *Fab.*)
Xanthonia 10-notata, *Say.*
Typophorus canellus (var. aterrimus.)
Chrysochus auratus, *Fab.*
Rhabdopterus picipes, *Oliv.*
Doryphora 10-lineata, *Say.*
Chrysomela bigsbyana, *Kirby.*
Galerucella nymphææ, *Linn.*
Diabrotica 12-punctata, *Fab.*
" vittata, *Fab.*
Phyllobrotica decorata, *Say.*
Cerotoma 3-furcata, *Forst.*
Dysonycha pennsylvanica, *Illig.*
Haltica ignita, *Illig.*
Crepidodera helxines, *Linn.*

Epitrix cucumeris, *Harris.*
Systena hudsonias, *Forst.*
marginalis, *Illig.*
Nyctobates pennsylvanica, *De G.*
Xylopinus saperdioides, *Oliv.*
Tenebrio molitor, *Linn.*
Blapstinus interruptus, *Say.*
Uloma impressa, *Mels.*
Diaperis hydni, *Fab.*
Boletotherus bifurcus, *Fab.*
Cistela sericea, *Say.*
Penthe pimelia, *Fab.*
Eustrophus confinis, *Lec.*
Canifa pallipes, *Mels.*
Stenotrachelus arctatus, *Say.*
Anaspis rufa, *Say.*
Mordella melæna, *Germ.*
marginata, *Mels.*
Xylophilus tuberculifer, (*infra.*)
Epicauta pennsylvanica, *De G.*
Attelabus bipustulatus, *Fab.*
Ithycerus noveboracensis, *Forst.*
Lissorhoptrus simplex, *Say.*
Magdalis armicollis, *Say.*
Orchestes niger, *Horn.*
Gymnetron tetrum, *Fab.*
Balaninus uniformis, *Lec.*
Eupsalis minuta, *Drury.*
Dryocœtes, n. sp.

CORRESPONDENCE.

NOTES ON HEPIALUS.

In CAN. ENT., Vol. XXV., p. 124, Mr. Neumoegen and myself referred *Hepialus quadriguttatus* as a synonym of *H. argenteomaculatus*, and described the salmon-colored form as a new variety. To this Mr. Grote objected (CAN. ENT., XXV., 186) and also Dr. Strecker, Proc. Acad. Sci. Phila., p. 282). In view of these opinions, it seems probable that we were wrong, and I correct the synonymy below. In the same paper, Dr. Strecker describes as new *Hepialus los*. I cannot see in his description anything but a form of *argenteomaculatus*, wanting one of the basal silver spots and possessing some additional spots subapically, such as we often see in *quadriguttatus*. I have had in my collection for some years a specimen more extreme than this seems to be, for it has none of the silver spots, being otherwise normally marked. I would propose for it the name *perdita*.

Our species of Hepialus of large size, with the apices of primaries rectangular, may be arranged as follows, and the generic term Stenopis, Pack, may be retained for them :—

S. ARGENTEOMACULATUS, Harris.
argentatus, Packard.
alni, Kellicott.
var. purpurascens, *Packard.*

var. los, *Strecker.*
var. perdita, *Dyar.*
var. quadriguttatus, *Grote.*
semiauratus, Neumoegen and Dyar.
S. THULE, Strecker.
S. AURATUS, Grote.

Dr. Strecker objects to the reference of *quadriguttatus* as a variery of *argenteomaculatus*, and would consider it a distinct species; but I am unable to find a good specific character. I should hesitate to rely on the colour alone in this genus, and have preferred to follow Prof. Smith's "List." HARRISON G. DYAR.

ALEXICLES ASPERSA, Grote.

As pointed out by Prof. Smith, the original description of Alexicles is entirely inadequate. In fact, no characters are given which will determine its family position, the author going as far as to partially retract his own opinion as to its location. I have before me the type, very kindly forwarded to me for examination by Mr. W. A. Snow. It is a true Arctian apparently most nearly allied to Leptarctia. Head moderately prominent, tongue imperceptible; median spurs of hind tibiæ wanting; anterior tibiæ armed at tip with a stout, slightly curved spine or claw. ♂ frenulum a long spine, hooked into a loop on subcostal vein of primaries. Venation arctiiform; one internal vein on primaries, two on secondaries; median veins four-branched, normal; cells closed; vein 8 of secondaries from the subcostal more than one-third the length of cell from base. On primaries no accessory cell; veins 7–10 stalked; 8 and 9 forming a short furcation near apex of wing; 7 nearer the furcation and 10 rather near the cell, leaving a long stalk between their origins; vein 11 from the subcostal near end of cell; vein 12 from the base half way between the subcostal vein and costa.

Fore-wings narrow, costa straight, apex rounded; hind-wings oval.

It is scarcely necessary to add anything to Mr. Grote's description of the species. Though short, it is excellent, as are nearly all of Mr. Grote's specific descriptions. Mr. Grote gives the expanse as 32 mm.; but in the type, mounted as usual, the wings reach 36 mm.

HARRISON G. DYAR.

DR. HAGEN.

We deeply regret the loss of our old friend, Dr. Hermann August Hagen, Professor of Entomology in Harvard University, who died, after a long illness, at Cambridge, Mass., on the 9th of November, in the seventy-seventh year of his age.

INDEX TO VOLUME XXV.

Aaron, E. M , article by, 258.
Acalles Curtus, n sp., 308.
Acalyptrate Muscidæ, larval food habits of, 10.
Acorutes longispinus, n sp., 315.
Acutalis apicalis, n. sp., 53.
" *trifurcata*, n. sp., 53.
Adelura tibialis, n. sp., 79.
Adoneta spinuloides, 302.
Adoxus obscurus, 278.
African butterflies, new species of, 1.
Agassiz Association, 188.
Agnomonia anilis, 156.
" erasa, 156.
" obsoleta, 156.
" quadrifilaris, 156.
Agrotids taken at trap lanterns 82.
Aldrich, J. M., article by. 25
Aleochara graciliformis, 276.
Alexicles aspersa, 328.
Alfalfa, lepidopterous larvæ on, 229.
Alucita Elliottii, n. sp , 95.
" *Eupatorii*, n sp., 96.
" *Fishii*, n. sp., 95.
Amalopota Fitchi, n. sp., 280
Ammalo helops, 112.
Anisopogon, synopsis of asilid genus, 20.
" *ludius*, n. sp., 20.
" *patruelis*, n. sp., 21.
" *rubidus*, n. sp., 21.
Anoura magna, n. sp., 128.
Anurida maritimia, 314.
Aphelenchus olesistus, 269.
Aphodius leopardus, 277.
Aphoromma, n. gen., 314.
Aphorura, n. gen., 313.
Aphoruridæ, table of genera, 313.
Archilithobius Bruneri, n sp., 162.
" *dorsospinorum*, n. sp., 162.
" *Malterris*, n. sp., 161.
" *Nebrascensis*, n. sp., 161.
Argynnis amphilocus, 186.
" Astarte, 186.
" Egleis, 259.
" Victoria, 186.
Artaxa ingenita, 121.
Ashmead, W. H., article by, 67.
Astatus bicolor, 27, 44.
" pygidialis, 27, 44.
Aterica fuliginosa, n. sp., 2,
Athysanus extrusus, n. sp., 283.
" *instabilis*, n. sp., 284.
" table of species, 285.
Automeris Io., var. *Argus*, n. var., 123.

Balaninus confusor, n. sp., 309.
Banks, N., articles by, 27, 64, 205, 252.
Baptolinus? longiceps, 276.
Bean, T. E., article by, 145.
Bembidium postfasciatum n. sp., 305.
Bethune, C J. S., articles by, 260, 261, 295.
Blacodes, synopsis of asilid genus, 33.
" *clausus*, n. sp., 34.
" *cristatus* n. sp. 33.
" *truncus*, n. sp., 34.
Blapstinus auripilis, 35.
Blatchley, W. S., article by, 89.
Blennocampa atrata, n. sp., 239.
" *populifoliella*, n. sp., 304.
Blissus leucopterus, 35.
Bolbonota bispinifera, n. sp., 55.
Bolitochara picta, 276.
Bombycids, unidentified, 125, 164, 188, 211, 301.
Book notices, 27, 86, 235, 295.
Bourletia, n. gen., 313.
Brachysius, n. gen., 317,
" *dilatatus*, n. sp , 317.
Bracon lixi, n. sp., 67.
" *rufomarginatus*, n. sp., 68.
Braconids, descriptions of new, 67.
Butterflies, new African, 1.
Butterflies of Grand Rapids, Mich., 98.
" " Laggan, 145.
" " North America, Edwards, 86.
Butterflies, Scudder's Brief Guide to, 235.
Butterfly larvæ not hitherto described, 93.
" Notes on a Polymorphic, 286.

Cænophanes anthaxiæ, n. sp., 77.
" *hylotrupidis*, n. sp., 78.
" *languriæ*, n. sp., 77.
" *pityophthori*, n. sp., 78.
" table of species, 74.
Calandra oryzæ, 36.
Caligo Teucer, 311.
Callidryas Eubule, 296.

Can the Diptera be considered the highest insects, 7, 25, 135.
Carterocephalus mandan, 145, 257.
" palæmon, 145, 257.
Catocaline moths from Georgia, 153.
Certila flexuosa, 303.
Chætosticha pretiosa, 256.
Chalcid parasite, 256,
Chelanops grossus, n. sp , 65.
" *latus*, n. sp., 64.
" *pallipes*, n. sp., 64.
Chernetidæ, new from the U. States, 64.
Chionobas subhyalina, 137.
Chlænius Pennsylvanicus, 275.
Chlorotettix necopina, n. sp.. 282.
Chrysomela exclamationis, description of grubs, 168.
Chrysophanus dione, larva and chrysalis of, 22.
Chthonius spinosus, n. sp., 67.
Cicadula Slossoni, n. sp., 281.
Cisthene lactea, 301.
Clerus formicarius, 267.
Clisiocampa, additions to genus, 4.
" *ambisimilis*, n. sp., 40.
" Americana, taken at trap-lanterns, 81.
" *Azteca*, n. sp., 5.
" fragilis, 112.
" larvæ of, 37.
" *mus*, n. sp.. 4.
" " var. *discolorata*, n. var. 4.
" *pluvialis*, n. sp., 42.
Clover-leaf weevil in Italy, 255.
Cockerell, T. D. H., articles by, 26, 112, 181, 221, 294.
Cœlinius Hopkinsii, n. sp , 77.
Coleocentrus Canadensis, n. sp., 29.
" *Pettitii*, n. sp., 30.
" table of species, 30.
Coleoptera affecting forest trees, 201.
" hints on collecting in winter, 97.
" new arrangement of, 9.
" occurring near Allegheny, Pa., descriptions of, 305.
" taken at Sparrow Lake, 272, 324,
Colias Behrii, 158.
" Philodice, 104.
" " var. *luteitincta*, n. var., 104.
Conocephalus palustris, n. sp., 89.
Copimamestra, note on, 184.
Coquillett. D W., articles by, 20, 33, 80, 118, 175, 197, 222, 260.
Coriscium cuculipenellum, 96.
Cornell Insectary, notes from, 81.
Corrections 25, 56, 260, 296.
Corymbites elongaticollis, n sp., 307.
Cotton-wood leaf miner, 304
Crœsus latitarsus, 246.
Crambus albilineellus, n. sp., 94.
" *Coloradellus*, n. sp., 95.
Creophilus maxillosus, 276.
Crocota rosa, female of, 25.
Crossidius, some interesting colour varieties in genus, 189.
Cucullia, revision of genus, 45.
Cycnia dubia, suggestion as to the identity of, 180.
Cynipids, two new, from Washington State, 110.

Dalcerides, n. gen., 121.
Dasychira clandestina, 303.
Davis, W. T., article by, 108.
Dialytes Ulkei, 278.
Diastrophus Kincaidii, n. sp., 110.
Dioctria parvulus, n. sp., 80.
" *rubidus*, n sp., 80.
" Synopsis of asilid genus, 80.
Diptera from San Domingo, 170
Dolerus borealis, n. sp., 238.
" sericeus, 238.
Dryocœtes affaber ? 279.
Dyar, H. G., articles by, 27, 28, 37, 93, 121, 158, 180, 185, 188, 195, 220, 244, 256, 301, 327, 328.
Dyaria, n. gen., 213.
" *singularis*, n. sp., 215.
Dysonycha Pennsylvanica, 279.

Ecthrus Provancheri, 32, 57.
" *rufopedibus*, n. sp., 31.
" table of species, 31.
Economic Entomologists, fifth annual meeting of, 263.
Edwards, W. H., articles by, 137, 253, 286.
Efferia, n. gen., 175.
" *candida*, n. sp., 176.
" *pernicis*, n. sp., 175.
" *rava*, n. sp., 176.
Ehrmann, G. A., article by, 257.
Elwes, W. J., article by, 186.
Emphytus multicolor, 59.
Entomological Society of Ontario, annual meeting of 293.
Erax, new asilid genus related to, 175.
Erebus odora, 310.
Euchophyllum Rileyi, n. sp., 56.

Eucoptocnemis fimbriaris, 216.
" var. *sordida*, n. var., 217.
" the species of, 216.
Eudriinæ, on the, 319.
Eudryas Cypris, n, sp., 322.
" grata, 320.
" Stæ. Johannis, 320.
" unio, 321.
Eulepidotis, note on, 184.
Eumelia Danbyi, 25.
Euphædra imitans, n. sp , 3.
Eurosta bigeloviæ, n. sp., 49.
Eurybunus, n. gen,, 209.
" *brunneus*, n. sp., 209.
Euryphene castanea, n. sp., 1.
" *suffumigata*, n. sp., 2.
Exochilum mundum attacking fall webworm, 312.
Experimental Farms, report of, 295.

Felt, E. P., article by, 129.
Feltia jaculifera, 82.
" subgothica, 82.
Fenusa varipes, 59, 247.
Fernald, C. H , article by, 94.
Field notes from Texas and Louisiana, 139.
Field, W. L. W., article by, 88.
Fitch's types of N. American Membracidæ, 171, 196,
Fletcher J., articles by, 86, 163, 235.
Ford, A., article by, 97.
Forest trees, insects affecting, 201.
Fox, W. J., articles by, 44, 113.
French, G. H., article by, 25.
Fyles, T. W., articles by, 23, 107, 109.

Gastropacha, a new, 144.
Gibb, L., articles by, 88, 177.
Gillette, C. P., article by, 110.
Globipes, n. gen., 208.
" *spinulatus*, n. sp., 208.
Gluphisia clandestina, 303.
" septentrionalis, 303.
" trilineata. 303.
Gnathocephalus, n. gen., 318.
" *complexus*, n. sp , 318.
Goding, F. W., articles by, 53, 171, 196.
Gorytes dentatus, n. sp., 116.
Grammodes concolor, n sp., 155.
" consobrina, 154.
" similis, 155.
" Smithii, 154.
Grote, A. R., articles by, 45, 56, 153, 184, 186, 211, 216, 319.

Hagen, Dr. H. A., death of, 328.
Halisidota macularia, 27.
" megapyrrha, 27.
Hamilton, J., articles by, 272, 305, 324.
Harpiphorus tarsatus, 59.
Harrington, W. H., articles by, 29, 57.
Hart, C. A., article by, 27.
Helcon occidentalis, 78.
Heliophobus fimbriaris, 216.
Hemichroa Americana, 244.
Hemiptychus castaneus, n sp., 307.
Hepialus argenteomaculatus, 124, 186, 300, 327.
" auratus, 260, 327.
" los, 327.
" McGlashani, 300.
" mustelinus, 299.
" *perdita*, n var., 327.
" quadriguttatus, 125, 186, 327.
" *roseicaput*, n. sp., 125.
" thule, occurrence of, at Montreal, 297.
" velleda, 299.
Histoire Naturelle des Araignees : Simon, 27.
Holland, W. J., articles by, 1, 310.
Homolophus, n. gen., 208.
" *arcticus*, n. sp., 208.
Homoptera, new N. American, 280.
Honey-bee or house-fly, 7, 25, 135.
Hoplocampa pallipes, n. sp., 239.
Howard, L. O., article by, 263.
Hudson, G H., article by, 24.
Hyblæa puera, 294.
Hymenoptera, Canadian. 29, 57.
" new species of fossorial, 113.
Hyperchiria Io., var. *Argus*, n. var., 123.
Hyphantria cunea, 312.
Hypoprepia miniata, var. *subornata*, n. var., 124.
" table of species, 124.
Hypopta Theodori, n. sp., 220.

Ichthyura apicalis, 303.
" table of species, 122, 303.
" vau, 159, 185, 303.
Ideoroncus obscurus, n. sp., 66.
Isomira ruficollis, n. sp., 308.

Jack, J. G., article by, 183.
Japyx Americanus, n. sp., 174, 219.
" Saussurii, 219.
" subterraneus, 173, 219.

Kenyan, F. C., article by, 161.
Kirkland, A H., article by. 312.

Labida opimus, var. *bigemina*, n. var., 195.
Lachnosterna taken at trap lanterns, 83.
Lac-insect, new, from Jamaica 181.
Larvæ, preservation of, for study, 265.
Larvophagous caterpillars, 88.
Leaf-miner of cotton-wood, 292.
Lecanium Fletcheri, n. sp., 221.
Lembert, J. B., article by, 259.
Lepidoptera, additions to list of Canadian, 149.
Lepidoptera, descriptions of new forms, 121.
" Heterocera, Synonymic Catalogue of, Kirby, 28.
Lepidopterous larvæ, descriptions of, 37, 93, 109, 133, 158, 185, 229, 248, 288, 292, 294.
Leptobunus, n. gen., 209.
" *Californicus*, n. sp., 210.
Leptura Canadensis, 278.
" vagans, 278.
Leucania pseudargyria, 109.
Limacodes ferrigera, 302.
Limenitis Arthemis, 312.
" Ursula, 311.
" Weidemeyeri, 312.
Liobunum bimaculatum, n. sp., 210.
Liparid genus, description of a new, 213.
Lithobius sexdentatus, n. sp , 162.
Lithophane oriunda, 186.
Locustidæ, some new, from Indiana, 89.
Loricera cærulescens, 275.
Lubbockia cærulea, 318.
Luminous worms, 88.
Lyda Olympia, n sp., 243.
Lyman, H. H., articles by, 248, 297.
Lysitermus Scolyticida, n. sp., 74.

Macgillivray, A. D., articles by, 127, 173, 218, 237, 296, 313.
Macrophya albilabris, n. sp., 60, Californica, 240.
" *magnifica*, n. sp., 240.
" *Oregona*, 240,
Mallophora Megachile, n. sp., 118.
" Synopsis of the asilid genus, 118.
Melalopha alethe, n. sp., 122.
Melanchroia cephise, 26.
Melia Danbyi, 25.
Membracidæ of N. America, 171, 196.
" " St. Vincent Island, 53.
Messa atra, n. sp., 238.
Microlepidoptera, new N. American, 94.
Mimesa maculipes, n. sp., 117.
Moffat, J. A., articles by, 149, 186, 234, 258.
Monophadnus atracornus, n. sp., 239.
Monostegia Kincaidii, n. sp , 239.
" maculata, 59.
Myriapoda of Nebraska, 161.
Myzine thoracica, n. sp., 113.

Neanura, n. gen., 314.
Nematus castaneus, 237.
" *lineatus*, n. sp., 59.
" luteolus, 238.
" *rufocinctus*, n sp., 58.
" *thoracicus*, n. sp., 58.
Nemeophila Scudderi, preparatory stages of, 248.
Neumoegen, B., articles by, 4, 6, 25, 121, 213.
Nicocles argentatus n. sp., 119.
" Synopsis of the asilid genus, 118
Noctuidæ, Catalogue of N. American: Smith, 295.
Nomophila noctuella, 129.
Notes and Queries, 310.

Ocneria dispar, 258
Œdematophorus cretidactylus, 96.
" occidentalis, 96.
Œdonia exigua, 302.
Oligolophus montanus, n. sp., 252.
Olpium obscurum, n. sp., 65.
Orchelimum Bruneri, n. sp., 92.
" *campestre*, n sp., 91.
" *Indianense*, n. sp., 90.
Oudemansia cærulea. 318.

Pachybaris strigapunctus, n. sp., 309
Pachyprotasis delta, 60.
" omega, 60.
" varipicta, 60.
Packard, A S., article by, 151.
Pamphilus cinctus, n. sp , 62.
" fascipennis, 62.
" *ruficeps*, n. sp , 62.
Papilio Bairdii, 253.
" Cresphontes, 260, 311.
" Hollandii, 253.
" Homerus, new localities for, 258.
" Notes on a polymorphic, 253.
" Oregonia, 253.
" Philenor, 311.
" " larvæ becoming larvophagous, 17.
" Turnus, black male of, 122.

Parnassius Clodius, 163.
" Smintheus, 163.
Patton, W. H., article by, 9.
Phalanginæ of the U States, 205.
Philonthus politus, 276.
Phlœotribus liminaris, 111.
Phurys flavistriaria, 157.
" perplexa, 157.
Phyciodes Carlota, 93, 99
Phyllodesma Dyari, n sp., 144.
Phytomyza affinis, 265.
Phytonomus punctatus, 255.
Piophila casei, 270.
Planiceps calcaratus, n sp., 115.
Platynus parmarginatus, n. sp , 305.
Platypteryx arcuata, 24.
" genicula, 24.
Podura granulata, n. sp., 316.
Podurhippus, 316.
Poduridæ, table of genera, 315.
Pompilus posterus, n. sp., 115.
" *relativus*, n. sp , 114
Prionia, a new form of, 24.
" *levis*, n. sp., 24.
Prionoxystus robiniæ, variety of, 257.
Protolophus, n gen., 206.
" *singularis*, n. sp , 207.
" *tuberculatus*, n. sp., 206.
Pseudachorutes subcrassus, 317.
Pseudanaphora arcanella, 301.
Pseudopsyche exigua, 301.
Psilocephala Aldrichii, n. sp., 227.
" *baccata*, n. sp., 226.
" *festina*, n. sp., 225
" *Johnsoni*, n sp., 228.
" *marcida*, n. sp., 228.
" *montivaga*, n. sp., 226.
" *morata*, n. sp., 225.
" *obscura*, n. sp , 229.
" *pavida*, n sp , 226.
" *Slossoni*, n sp , 227.
" Synopis of genus, 222.

Raphia frater, 303.
Rhysipolis hiformis, n. sp., 68.
Rhyssalus pityophthori, n. sp., 69.
Rivers, J. J., article by, 144.
Roncus pacificus, n. sp., 66.

Schizocerus tristis, var. *fumipennis*, n. var., 195.
Schoturus, n. gen., 316.
Scudder's Brief Guide to Butterflies, 235.
Sesiiadæ, notes on collecting in England, 177.
Sitotroga cerealella, 36.
Skinner, H., articles by, 22, 257.
Slosson, Mrs., articles by, 152, 260,
Smith, J. B., article by, 164.
Smynthurus floridanus, n. sp., 127.
" *spinatus*, n. sp., 127.
Song of Thyreonotus, 108.
Soronia substriata, n. sp., 306.
Spathius brachyurus, n. sp., 73.
" *claripennis*, n. sp., 72.
" *pallidus*, n. sp., 74.
" *simillimus*, n. sp., 73.
" table of species, 70.
" *unifasciatus*, n. sp., 72.
Sphinx caterpillars, rearing, 234.
Sphongophorus albofasciata, n sp., 54.
" *vexillifera*, n. sp., 53.
Spilosoma virginica, 180.
Stenelophus humidus n. sp., 306.
Sthenopis argenteomaculatus, var. *semiauratus*, n. var., 124.
Strecker, H., article by, 163.
Strongylogaster pacificus, n. sp., 241.
" *primativus*, n. sp., 241.
" soriculatus, 61.
Synchloe adjutrix, 286.
" crocale, 286.
" lacinia, 286.
Synergus Garryana, n. sp., 110.
Systena marginalis. 279.

Tachardia gemmifera, n. sp., 181.
Tachinidæ, comments on Mr. Van der Wulp's diagnoses of new Mexican species, 165.
Taxonus dubitatus, 184.
" nigrisoma, 183.
Tenthredinidæ, descriptions of larvæ, 244.
" from Washington, 237.
" from Yo Semite, Cal., 195.
Tenthredo Barnstonii, 242.
" basillaris, 61.
" grandis, 61.
" nigricostata, 242.
" xanthus, 242.
Tenthredopsis annulicornis, n. sp., 61.
" Evansii, 61.
" *ruficorna*, n. sp, 242.
" *transversa*, n. sp., 242.
Tetracanthella pilosa, 316.
Texas, notes on injurious insects of, 35.
Thecla grunus, 94.
Thereva duplicis, n. sp., 199.
" *Johnsoni*, n. sp., 200.

Thereva nigra, 222
" *novella*, n sp., 200
" *otiosa*, n sp., 199.
" *semitaria*, n sp , 198.
" Synopsis of the dipterous genus, 197.
Theletia extranea, 301.
Thia extranea, 301.
Thyreonotus pachymerus, 108.
Thysanura. North American, 127, 173, 218, 313
Tolype, description of a new, 6
" *tolteca*, n sp , 6.
Townsend, C. H. T , articles by, 7, 10, 48, 135, 165, 168, 201, 229, 292, 304.
Trap-lantern experiment, results of, 81.
Tremex columba, 64.
Triæna mirabilis, 318.
Trypetid bred from galls on Bigelovia, 48, 112.
Tryphon flavifrons, n sp . 107.
Tullbergyia antarctica, 314.

Unidentified Bombycids, 125 164, 188, 211, 301.
Urocerus indecisus, n. sp., 243.
" *riparius*, n. sp., 244.
Uroceridæ from Washington, 237

Van Duzee E. P. article by, 280.
Van Winkle, A. S . articles by 212, 296
Varina ornata. systematic position of, 151.

Webster. F M : articles by 35 111, 255.
Westwood, the late Professor, 261.
Which side of the tree does Phlœotribus liminaris attack ? 111.
Wickham H. F.. articles by, 139 189.
Williston S. W. articles by. 170.
Winter collecting of coleoptera, 97.
Wolcott, R. H . article by, 98

Xenylla maritima 317.
Xilophilus tuberculifer. n. sp., 279.
Xiphydria Canadensis, 63.
" rufiventris, 63,
Xyela minor, 62.

Zaræa Americana, notes on, 23.

ERRATA.

Page 6, 3d line, for *P. tolteca* read *T. tolteca.*

Page 161. 20th line, for "Archilithabius' read "Archilithobius."

No. 1.

THE

Canadian Entomologist

VOLUME XXV.

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

JANUARY, - 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—J. FLETCHER, Ottawa; H. H. LYMAN, Montreal; REV. T. W. FYLES, South Quebec; J. H. BOWMAN, London.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members.....$1 00
For Associate Members in the United States..... 1 00
For Associate Members in England and elsewhere..... 1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, P. O. Order, Canadian, U. S. or English Stamps. Cheques on local banks not received, unless 25c. is added for collecting.

J. A. BALKWILL, Treasurer.

All remittances, business communications and exchanges should be addressed to

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

All manuscript for publication, books for review, etc., should be sent to the General Editor, Port Hope, Ont.

ADVERTISING RATES.
Payable Strictly in Advance.

For each insertion, per inch .....$ 50
One inch per year..... .... 4 00
Half page, " 10 00
Whole " " 15 00

Canadian Entomologist.—The back volumes 1 to 24 can be supplied at $1 each and cost of transportation (postage 3 cts. a volume to Canada and United States, and registration fee 5c. on each package of six volumes or less). Single copies, 10c. each.

Annual Reports.—1870 to 1872 inclusive are out of print; later numbers can be supplied at 50 cents each, and 2 cts. postage to Canada and United States.

SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage 3 cts. per 500, to Canada and United States, and registration fee 5c.

CORK.—¼ inch, 25 cts. per square foot; postage 5 cts; ⅛ inch, 15 cts. per square foot; postage 3 cts. a foot to Canada and United States, and registration fee 5c.

LIST OF LABELS FOR CANADIAN COLEOPTERA FOR CABINET USE.—This list is based upon Henshaw's List of 1885, and the supplement, 1887, and has a synonymical list connecting by number the names of the old list (after Crotch) to those of the new, in such cases as the change is too great to allow of the ready recognition of the new name. These lists will be supplied to members at 25c. per set of 26 sheets, post-paid. Address,

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

LIBRARY, OF SOCIETIES.

No. 3.

THE

Canadian Entomologist

VOLUME XXV.

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

MARCH, - 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

Pupæ and Specimens wanted of Native and Foreign Lepidoptera by purchase. Send your list with prices to ADAM KAUFMAN, Drawer L & K, Baden, Ont., Canada.

I wish to exchange large, healthy pupæ of Cecropia and Polyphemus for almost any other variety of Lepidoptera. JAMES TOUGH, 234 S. Water St., Chicago.

COLEOPTERA from this locality exchanged for foreign Coleoptera, Shells or Birds Eggs. JAMES JOHNSTON, 403 King Street West, Hamilton, Ontario, Canada.

DUPLICATES.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). DESIDERATA.—Correctly named types of American and Canadian Coleoptera and Diurni. ARTHUR FORD, Claremont House, Upper Tower Road, St. Leonard's-on-Sea, Sussex, England.

WANTED.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica*. Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. WEITH, Elkhart, Ind.

TO EXCHANGE.—Cocoons of *Callosamia ceanothi* for Sphingidæ, Arctiidæ, Bombycidæ and Catocalæ of northern, southern and western parts of North America. DR. RICHARD E. KUNZE, No. 606 Third Avenue, New York, N. Y.

Pupæ of the rare moths: *Luna*, *Angulifera*, *Imperialis*, *Regalis*, *P. fraterna*, *P. pithecium*, etc; also many fine specimens. *Hybrids ex Actias Selene, et Luna*, *Ceanothi et Cecropia*, *Gloveri and Cecropia*. Lists exchanged. EMILY L. MORTON, Newburgh, N. Y., New Windsor Delivery.

WANTED —I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. WICKHAM, Iowa City, Iowa.

PROF. J. B. SMITH, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ, and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

LEPIDOPTERA OF MONTANA exchanged for other desirable species. CHAS. A. WILEY, Miles City, Mont.

SPIDERS.—I wish to obtain American Spiders, and will exchange or name and return duplicate species. NATHAN BANKS, Sea Cliff, Queen's Co., N. Y.

COLEOPTERA.—I have about 1,500 species in duplicate and solicit exchanges, especially in Chrysomelidæ. CHARLES W. LANG, P. O. Box 3565, New York.

MYRIOPODA.—N. A. Myriopods wanted in exchange for insects of any order in this locality. Correspondence solicited. Howard Evarts Weed, Agricultural College, Miss.

TACHINIDÆ WANTED.—Named or unnamed Tachinidæ wanted in exchange from all parts of North America; also Dexiidæ. C. H. TYLER TOWNSEND, Las Cruces, New Mexico.

COLEOPTERA OF NORTH AMERICA AND MEXICO wanted by purchase or exchange (large collection). FRED. C. BOWDITCH, Tappan St., Brookline, Norfolk Co., Mass., U. S. A.

CYNIPIDÆ WANTED.—Named or unnamed Cynipidæ wanted by purchase or exchange. Always accompany the flies with their galls when possible. C. P. GILLETTE, Fort Collins, Colorado.

LEPIDOPTERA —Wanted to purchase good specimens of North American Lepidoptera in quantities, named or unnamed. Liberal prices paid collectors. DR. CHAS. S. MCKNIGHT, Saratoga Springs, New York.

CANADIAN HYMENOPTERA WANTED—Named or unnamed, for examination or in exchange. Correspondence desired with collectors in the Eastern and Western Provinces. W. HAGUE HARRINGTON, Post Office Department, Ottawa.

PHRYGANIDÆ WANTED.—Will exchange choice Coleoptera and Lepidoptera from Kansas, Colorado and New Mexico (Prof. F. H. Snow's collecting) for Caddise-flies, U. S. or exotic. VERNON L. KELLOGG, University of Kansas, Lawrence, Kansas.

Published Monthly, Price Sixpence.

THE ENTOMOLOGIST.

Edited by John T. Carrington, F. L. S.

AN ILLUSTRATED JOURNAL OF GENERAL ENTOMOLOGY.

SIMPKIN, MARSHALL & CO., Stationers' Hall Court,
London, Eng.

North American Lepidoptera.

THE HAWK MOTHS OF NORTH AMERICA: BY A. RADCLIFFE GROTE, A. M.

This work in pamphlet form will be sent on remitting price of One Dollar, by the publishers, Homeyer & Meyer, by the Author, Bremen, Germany; or address Rühle & Schlenker, Booksellers, Bremen.

NOW READY.

A new and revised *List* of the *Coleoptera* of America north of Mexico, by Samuel Henshaw, assisted by Dr. George H. Horn. Published by the American Entomological Society. Edition limited. **Price, $1.25.** Price List of Entomological papers for sale, mailed on application.

E. T. CRESSON, TREASURER,
P. O. Box 1577, Philadelphia, Pa.

BUTTERFLIES OF INDIA FOR SALE.

One hundred and fifty Indian Butterflies of 100 named varieties for £1 16s., free. Common species, three and four pence each; rarer species, 6d., 8d. and 1s. each. Address,

REV. W. A. HAMILTON, Chaplain of Shillong, Assam, India.

FOR 50 CENTS WE WILL SEND YOU FOR ONE YEAR

THE CONCHOLOGISTS' EXCHANGE

The only shell paper in America; 16 pages monthly, and full of the latest and best Shell News, and the following handsome premiums: A neat box of choice Land Shells, Fresh-Water Shells, or Marine Shells, or Berlin H. Wright's New Check List of North American Fresh Water Bivalves, or D. D. Baldwin's Land Shells of Hawaii. Don't wait, but send 50c. now to WM. D. AVERELL, Publisher,
Chestnut Hill, Phia., Pa.

FOR SALE.

The collection of Lepidoptera of Fred. Tepper. About 12,000 specimens, among which are many fine series and a great number of types, principally in the Noctuidæ.

Apply to P. O. Box 3331, New York.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—WM. SAUNDERS, Ottawa; J. M. DENTON, London; CAPT. GAMBLE GEDDES and DR. BRODIE, Toronto.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members.....$1 00
For Associate Members in the United States..... 1 00
For Associate Members in England.....4s. sterling
For Associate Members elsewhere.....$1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, Postal Note, Canadian, U. S. or English Stamps, P. O. Order or draft on New York, but cheques on local banks will not be received.

All remittances and other business communications should be addressed to the Secretary-Treasurer of the Society, W. E. SAUNDERS, 240 Central Ave, London, Ontario. Send all manuscript for publication to the General Editor.

Canadian Entomologist.—The back volumes 1 to 19 can be supplied at $1 each and cost of transportation.

Annual Reports.—1870 to 1873 inclusive are out of print; later numbers can be supplied at 50 cents each.

ADVERTISING RATES.

Payable Strictly in Advance.

For each insertion, per inch .....$ 50
One inch per year..... .... 4 00
Half page, " 10 00
Whole " " 15 00
Exchange notices of 2 lines, each insertion..... 25
Additional matter in exchange notices, per line..... 5

SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage extra.

CORK.—Double thickness, 30 cts. per square foot. Postage extra.

LIST OF CANADIAN COLEOPTERA.—Price 15 cts. each, embracing 55 families, 432 genera, and 1231 species (for labelling cabinets). Printed Numbers, in sheets, 1 to 2000, for labelling cabinets. Price 10 cts. each set. Postage extra.

No. 4.

THE

Canadian Entomologist

VOLUME XXV.

SCIENCE
LIBRARY

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

APRIL, - 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—J. FLETCHER, Ottawa; H. H. LYMAN, Montreal; REV. T. W. FYLES, South Quebec; J. H. BOWMAN, London.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members $1 00
For Associate Members in the United States 1 00
For Associate Members in England and elsewhere 1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, P. O. Order, Canadian, U. S. or English Stamps. Cheques on local banks not received, unless 25c. is added for collecting.

J. A. BALKWILL, Treasurer.

All remittances, business communications and exchanges should be addressed to

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

All manuscript for publication, books for review, etc., should be sent to the General Editor, Port Hope, Ont.

ADVERTISING RATES.
Payable Strictly in Advance.

For each insertion, per inch ..... $ 50
One inch per year 4 00
Half page, " 10 00
Whole " " 15 00

Canadian Entomologist.—The back volumes 1 to 24 can be supplied at $1 each and cost of transportation (postage 3 cts. a volume to Canada and United States, and registration fee 5c. on each package of six volumes or less). Single copies, 10c. each.

Annual Reports.—1870 to 1872 inclusive are out of print; later numbers can be supplied at 50 cents each, and 2 cts. postage to Canada and United States.

SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage 3 cts. per 500, to Canada and United States, and registration fee 5c.

CORK.—¼ inch, 25 cts. per square foot; postage 5 cts; ⅛ inch, 15 cts. per square foot; postage 3 cts. a foot to Canada and United States, and registration fee 5c.

LIST OF LABELS FOR CANADIAN COLEOPTERA FOR CABINET USE.—This list is based upon Henshaw's List of 1885, and the supplement, 1887, and has a synonymical list connecting by number the names of the old list (after Crotch) to those of the new, in such cases as the change is too great to allow of the ready recognition of the new name. These lists will supplied to members at 25c. per set of 26 sheets, post-paid. Address,

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

No. 5.

THE

Canadian Entomologist

VOLUME XXV.

N.Y. ACAD
LIBRA
OF SCIENC

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

MAY, - 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

Pupæ and Specimens wanted of Native and Foreign Lepidoptera by purchase. Send your list with prices to ADAM KAUFMAN, Drawer L & K, Baden, Ont., Canada.

I wish to exchange large, healthy pupæ of Cecropia and Polyphemus for almost any other variety of Lepidoptera. JAMES TOUGH, 234 S. Water St., Chicago.

DUPLICATES.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). DESIDERATA.—Correctly named types of American and Canadian Coleoptera and Diurni. ARTHUR FORD, Glenmount, 107 Braybrooke Road, Hastings, Sussex, England.

WANTED.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica*. Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. WEITH, Elkhart, Ind.

TO EXCHANGE.—Cocoons of *Callosamia ceanothi* for Sphingidæ, Arctiidæ, Bombycidæ and Catocalæ of northern, southern and western parts of North America. DR. RICHARD E. KUNZE, No. 606 Third Avenue, New York, N. Y.

Pupæ of the rare moths: *Luna*, *Angulifera*, *Imperialis*, *Regalis*, *P. fraterna*, *P. pithecium*, etc; also many fine specimens. *Hybrids ex Actias Selene, et Luna*, *Ceanothi et Cecropia*, *Gloveri and Cecropia*. Lists exchanged. EMILY L. MORTON, Newburgh, N. Y., New Windsor Delivery.

WANTED.—I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. WICKHAM, Iowa City, Iowa.

PROF. J. B. SMITH, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ, and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

SPIDERS.—I wish to obtain American Spiders, and will exchange or name and return duplicate species. NATHAN BANKS, Sea Cliff, Queen's Co., N. Y.

COLEOPTERA.—I have about 1,500 species in duplicate and solicit exchanges, especially in Chrysomelidæ. CHARLES W. LANG, P. O. Box 3565, New York.

MYRIOPODA.—N. A. Myriopods wanted in exchange for insects of any order in this locality. Correspondence solicited. Howard Evarts Weed, Agricultural College, Miss.

TACHINIDÆ WANTED.—Named or unnamed Tachinidæ wanted in exchange from all parts of North America; also Dexiidæ. C. H. TYLER TOWNSEND, Las Cruces, New Mexico.

COLEOPTERA OF NORTH AMERICA AND MEXICO wanted by purchase or exchange (large collection). FRED. C. BOWDITCH, Tappan St., Brookline, Norfolk Co., Mass., U. S. A.

CYNIPIDÆ WANTED.—Named or unnamed Cynipidæ wanted by purchase or exchange. Always accompany the flies with their galls when possible. C. P. GILLETTE, Fort Collins, Colorado.

LEPIDOPTERA.—Wanted to purchase good specimens of North American Lepidoptera in quantities, named or unnamed. Liberal prices paid collectors. DR. CHAS. S. MCKNIGHT, Saratoga Springs, New York.

CANADIAN HYMENOPTERA WANTED—Named or unnamed, for examination or in exchange. Correspondence desired with collectors in the Eastern and Western Provinces. W. HAGUE HARRINGTON, Post Office Department, Ottawa.

PHRYGANIDÆ WANTED.—Will exchange choice Coleoptera and Lepidoptera from Kansas, Colorado and New Mexico (Prof. F. H. Snow's collecting) for Caddise-flies, U. S. or exotic. VERNON L. KELLOGG, University of Kansas, Lawrence, Kansas

No. 7.

THE

Canadian Entomologist

VOLUME XXV.

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

JULY, - 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

LIBRARY OF SCIENCE

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

DUPLICATES.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). DESIDERATA.—Correctly named types of American and Canadian Coleoptera and Diurni. ARTHUR FORD, Glenmount, 107 Braybrooke Road, Hastings, Sussex, England.

WANTED.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica*. Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. WEITH, Elkhart, Ind.

WANTED —I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. WICKHAM, Iowa City, Iowa.

PROF. J. B. SMITH, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ, and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

SPIDERS.—I wish to obtain American Spiders, and will exchange or name and return duplicate species. NATHAN BANKS, Sea Cliff, Queen's Co., N. Y.

COLEOPTERA —I have about 1,500 species in duplicate and solicit exchanges, especially in Chrysomelidæ. CHARLES W. LANG, P. O. Box 3565, New York.

MYRIOPODA.—N. A. Myriopods wanted in exchange for insects of any order in this locality. Correspondence solicited. Howard Evarts Weed, Agricultural College, Miss.

TACHINIDÆ WANTED.—Named or unnamed Tachinidæ wanted in exchange from all parts of North America; also Dexiidæ. C. H. TYLER TOWNSEND, Las Cruces, New Mexico

COLEOPTERA OF NORTH AMERICA AND MEXICO wanted by purchase or exchange (large collection). FRED. C. BOWDITCH, Tappan St., Brookline, Norfolk Co., Mass., U. S. A.

CYNIPIDÆ WANTED.—Named or unnamed Cynipidæ wanted by purchase or exchange. Always accompany the flies with their galls when possible. C. P. GILLETTE, Fort Collins, Colorado.

LEPIDOPTERA —Wanted to purchase good specimens of North American Lepidoptera in quantities, named or unnamed. Liberal prices paid collectors. DR. CHAS. S. MCKNIGHT, Saratoga Springs, New York.

CANADIAN HYMENOPTERA WANTED—Named or unnamed, for examination or in exchange. Correspondence desired with collectors in the Eastern and Western Provinces. W. HAGUE HARRINGTON, Post Office Department, Ottawa.

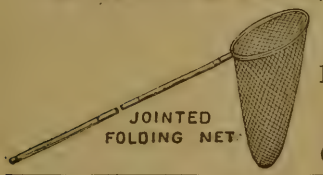
PHRYGANIDÆ WANTED.—Will exchange choice Coleoptera and Lepidoptera from Kansas, Colorado and New Mexico (Prof. F. H. Snow's collecting) for Caddise-flies, U. S. or exotic. VERNON L. KELLOGG, University of Kansas, Lawrence, Kansas

FOR SALE

Teinopalpus imperialis female, $1.25. Ornithoptera rhadamanthus, $1.25. Papilio nireus, 10c.; menestheus, 50c ; policenes, 20c ; helenus, 30c.; demolens, 10c.; cyprœfila, 50c.; Slateri, $2 ; epycides, 75c.; uranus, 50c.; aristolochiæ, 20c.; rhodifer, $1 ; erithonius, 15c ; Krishna, $1 50 ; anticrates, 30c.; agamemnon, 15c.; leonidas, 15c., and several hundred other rare exotic butterflies at low prices. All fine specimens.

J. T. T. REED, (Member of the International Entomological Society),
RYHOPE, NEAR SUNDERLAND, ENGLAND.

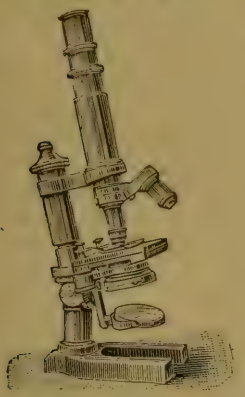
A. SMITH & SONS, 114 FULTON STREET, New York.
MANUFACTURERS AND IMPORTERS OF



GOODS FOR ENTOMOLOGISTS,
Klaeger and Carlsbad Insect Pins, Setting Boards, Folding Nets, Locality and Special Labels, Forceps, Sheet Cork, Etc. Other articles are being added, Send for List.

FOR SALE.

—SPECIMENS OF—
Japanese Lepidoptera, Orthoptera, Coleoptera, Hymenoptera, Shells, Etc.
REV. H. LOOMIS, Yokohama, Japan.



LEITZ'S MICROSCOPES

Used by the Principal Universities and Schools of the Dominion.

RANGE IN PRICE FROM $21 TO $175

An Illustrated Catalogue on Application.

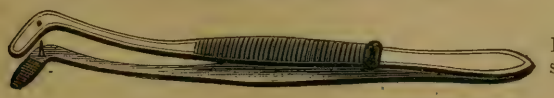
LYMAN SONS & CO.,
MONTREAL,
-:- -:- -:- -:- **Agents for the Dominion of Canada.**

BUTTERFLIES OF NORTH AMERICA.

Part XIII., Vol., 3, will issue 1st October, 1892. Contents: *Chionobas Calais; C. Jutta*, and all stages; *C. Crambis; C. Brucei*, and all stages. Three plates. Price, $2.25. Vol. I., bound, $40.; Vol. II., bound, $45.

Apply to HOUGHTON, MIFFLIN & CO., CAMBRIDGE, MASS.

JOHN AKHURST,
TAXIDERMIST AND DEALER IN ENTOMOLOGICAL SUPPLIES.



IMPROVED ENTOMOLOGICAL FORCEPS.

Fine Carlsbader Insect Pins a specialty. Price List sent on application.
78 Ashland Place,
BROOKLYN, N. Y.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—J. FLETCHER, Ottawa; H. H. LYMAN, Montreal; REV. T. W. FYLES, South Quebec; J. H. BOWMAN, London.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members.....$1 00
For Associate Members in the United States..... 1 00
For Associate Members in England and elsewhere..... 1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, P. O. Order, Canadian, U. S. or English Stamps. Cheques on local banks not received, unless 25c. is added for collecting.

J. A. BALKWILL, Treasurer.

All remittances, business communications and exchanges should be addressed to

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

All manuscript for publication, books for review, etc., should be sent to the General Editor, Port Hope, Ont.

ADVERTISING RATES.

Payable Strictly in Advance.

For each insertion, per inch .....$ 50
One inch per year..... 4 00
Half page, " 10 00
Whole " " 15 00

Canadian Entomologist.—The back volumes 1 to 24 can be supplied at $1 each and cost of transportation (postage 3 cts. a volume to Canada and United States, and registration fee 5c. on each package of six volumes or less). Single copies, 10c. each.

Annual Reports.—1870 to 1872 inclusive are out of print; later numbers can be supplied at 50 cents each, except the 8th, and 2 cts. postage to Canada and United States.

SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage 3 cts. per 500, to Canada and United States, and registration fee 5c.

CORK.—¼ inch, 25 cts. per square foot; postage 5 cts; ⅛ inch, 15 cts. per square foot; postage 3 cts. a foot to Canada and United States, and registration fee 5c.

LIST OF LABELS FOR CANADIAN COLEOPTERA FOR CABINET USE.—This list is based upon Henshaw's List of 1885, and the supplement, 1887, and has a synonymical list connecting by number the names of the old list (after Crotch) to those of the new, in such cases as the change is too great to allow of the ready recognition of the new name. These lists will be supplied to members at 25c. per set of 26 sheets, post-paid. Address,

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

No. 8.

THE

Canadian Entomologist

VOLUME XXV.

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

N.Y. ENTOMOLOGICAL SOCIETY LIBRARY

PA AUGUST, - 1893.

Eight h
Exact localities
My annual pr

LONDON:
PRINTING AND LITHOGRAPHING CO.
1893.

JOH
TAXIDERMIST AND

IMPROVED ENTOMOLOGICAL FC

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

HESPERIDÆ.—A few *P. viator;* also *P. dion* and *Grapta j-album* to exchange for desirable Hesperidæ. H. E. WILFORD, Batavia, N. Y.

EXOTIC ICHNEUMONIDÆ.—Would like to exchange North American Ichneumonidæ for correctly determined exotic species of the family. G. C. DAVIS, Agricultural College, Ingham Co., Michigan.

DUPLICATES.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). DESIDERATA.—Correctly named types of American and Canadian Coleoptera and Diurni. ARTHUR FORD, Glenmount, 107 Braybrooke Road, Hastings, Sussex, England.

WANTED.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica.* Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. WEITH, Elkhart, Ind.

WANTED —I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. WICKHAM, Iowa City, Iowa.

PROF. J. B. SMITH, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ, and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

SPIDERS.—I wish to obtain American Spiders, and will exchange or name and return duplicate species. NATHAN BANKS, Sea Cliff, Queen's Co., N. Y.

COLEOPTERA —I have about 1,500 species in duplicate and solicit exchanges, especially in Chrysomelidæ. CHARLES W. LANG, P. O. Box 3565, New York.

MYRIOPODA.—N. A. Myriopods wanted in exchange for insects of any order in this locality. Correspondence solicited. Howard Evarts Weed, Agricultural College, Miss.

TACHINIDÆ WANTED.—Named or unnamed Tachinidæ wanted in exchange from all parts of North America; also Dexiidæ. C. H. TYLER TOWNSEND, Las Cruces, New Mexico.

COLEOPTERA OF NORTH AMERICA AND MEXICO wanted by purchase or change (large collection). FRED. C. BOWDITCH, Tappan St., Brookline, Norfolk Mass., U. S. A.

CYNIPIDÆ WANTED.—Named or unnamed Cynipidæ wanted by purchase or change. Always accompany the flies with their galls when possible. C. P. GILLETTE; Fort Collins, Colorado.

LEPIDOPTERA —Wanted to purchase good specimens of North American Lepidoptera in quantities, named or unnamed. Liberal prices paid collectors. Lists solicited. S. McKNIGHT, Saratoga Springs, New York.

CANADIAN HYMENOPTERA WANTED—Named or unnamed, for exchange. Correspondence desired with collectors in the Eastern Provinces. W. HAGUE HARRINGTON, Post Office Department, Ottawa.

PHRYGANIDÆ WANTED.—Will exchange choice Coleoptera and Lepidoptera for Kansas, Colorado and New Mexico (Prof. F. H. Snow's list). These lists will contain the names of the old and the supplement, as the change is too U. S. or exotic. VERNON L. KELLOGG, University, Kansas, post-paid. Address,

OR CABINET

OF ONTARIO,

oria Hall, London, Ont.

BUTTERFLIES OF NORTH AMERICA.

Part XIV., Vol. 3, will issue 1st November, 1893. Contents: Neominois Ridingsii and all stages; Chionobas Œno; Chionobas Macounii and stages. Three plates. Price, $2.25. Vol. I., bound, $40; Vol. II., $45.

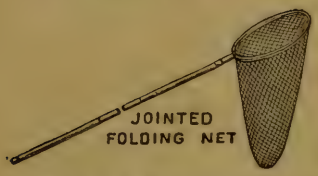
Apply to HOUGHTON, MIFFLIN & CO., CAMBRIDGE, MASS.

TWELVE MONTHS.

THE CANADIAN BEE JOURNAL, a live bee paper edited by R. F. Holtermann, will be sent to any new subscriber for twelve months for 50 cents, stamps or silver. Renewals, $1.00 per year. Address: GOOLD, SHAPLEY & MUIR COMPANY (Ltd.), Brantford, Canada.

50 CENTS.

A. SMITH & SONS, 121 NASSAU STREET, New York.



MANUFACTURERS AND IMPORTERS OF

GOODS FOR ENTOMOLOGISTS,

Klaeger and Carlsbad Insect Pins, Setting Boards, Folding Nets, Locality and Special Labels, Forceps, Sheet Cork, Etc. Other articles are being added. Send for List.

FOR SALE.

—SPECIMENS OF—

Japanese Lepidoptera, Orthoptera, Coleoptera, Hymenoptera, Shells, Etc.

REV. H. LOOMIS, Yokohama, Japan.

LEITZ'S MICROSCOPES

Used by the Principal Universities and Schools of the Dominion.

RANGE IN PRICE FROM $21 TO $175

An Illustrated Catalogue on Application.

LYMAN SONS & CO.,

MONTREAL,

-:- -:- -:- -:- **Agents for the Dominion of Canada.**

PACIFIC - COAST - COLEOPTERA

—o—o—o—o—o—

Eight hundred species for sale in single specimens or collections. Correct names! Exact localities! First-class specimens!

My annual price list, No. 13, is ready and will be sent on application.

L. E. RICKSECKER, OCCIDENTAL, SONOMA CO., CAL.

JOHN AKHURST,

TAXIDERMIST AND DEALER IN ENTOMOLOGICAL SUPPLIES.

IMPROVED ENTOMOLOGICAL FORCEPS.

Fine Carlsbader Insect Pins a specialty. Price List sent on application.

78 Ashland Place,

BROOKLYN, N. Y.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

HYBRID COCOONS ex *Ceanothi et Cecropia* now for sale or exchange for rare, perfect *Sphingidæ*, *Arctiidæ*, *Bombycidæ*, *Catocalæ* and *Diurni* not in my collection. DR. RICHARD E. KUNZE, 606 Third Avenue, New York.

WANTED.—Coleoptera and Lepidoptera from all sections. Will exchange works on Entomology, Zoology, Botany, and works relating to the languages of the N. A. Indian. Send for list. WM. D. DOAN, Box 377, Coatesville, Penn.

HESPERIDÆ.—A few *P. viator;* also *P. dion* and *Grapta j-album* to exchange for desirable Hesperidæ. H. E. WILFORD, Batavia, N. Y.

EXOTIC ICHNEUMONIDÆ.—Would like to exchange North American Ichneumonidæ for correctly determined exotic species of the family. G. C. DAVIS, Agricultural College, Ingham Co., Michigan.

DUPLICATES.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). DESIDERATA.—Correctly named types of American and Canadian Coleoptera and Diurni. ARTHUR FORD, Glenmount, 107 Braybrooke Road, Hastings, Sussex, England.

WANTED.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica*. Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. WEITH, Elkhart, Ind.

WANTED —I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. WICKHAM, Iowa City, Iowa.

PROF. J. B. SMITH, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ, and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

SPIDERS.—I wish to obtain American Spiders, and will exchange or name and return duplicate species. NATHAN BANKS, Sea Cliff, Queen's Co., N. Y.

COLEOPTERA —I have about 1,500 species in duplicate and solicit exchanges, especially in Chrysomelidæ. CHARLES W. LANG, P. O. Box 3565, New York.

MYRIOPODA.—N. A. Myriopods wanted in exchange for insects of any order in this locality. Correspondence solicited. Howard Evarts Weed, Agricultural College, Miss.

TACHINIDÆ WANTED.—Named or unnamed Tachinidæ wanted in exchange from all parts of North America; also Dexiidæ. C. H. TYLER TOWNSEND, Las Cruces, New Mexico.

COLEOPTERA OF NORTH AMERICA AND MEXICO wanted by purchase or exchange (large collection). FRED. C. BOWDITCH, Tappan St., Brookline, Norfolk Co., Mass., U. S. A.

CYNIPIDÆ WANTED.—Named or unnamed Cynipidæ wanted by purchase or exchange. Always accompany the flies with their galls when possible. C. P. GILLETTE, Fort Collins, Colorado.

LEPIDOPTERA —Wanted to purchase good specimens of North American Lepidoptera in quantities, named or unnamed. Liberal prices paid collectors. DR. CHAS. S. MCKNIGHT, Saratoga Springs, New York.

CANADIAN HYMENOPTERA WANTED—Named or unnamed for examination or in exchange. Correspondence desired with collectors in the Eastern and Western Provinces. W. HAGUE HARRINGTON, Post Office Department, Ottawa.

PHRYGANIDÆ WANTED.—Will exchange choice Coleoptera and Lepidoptera from Kansas, Colorado and New Mexico (Prof. F. H. Snow's collecting) for Caddise-flies, U. S. or exotic. VERNON L. KELLOGG, University of Kansas, Lawrence, Kansas.

ANNUAL MEETING AT LONDON, ON WEDNESDAY, OCTOBER 11TH.

No. 10.

THE

Canadian Entomologist

VOLUME XXV.

N.Y. ACADEMY OF SCIENCES LIBRARY

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

OCTOBER, 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

PACIFIC - COAST - COLEOPTERA

—o—o—o—o—o—

Send for new list (No. 12), giving names and prices of six collections of fifty species (200 specimens) each, for from $2 to $10 per collection. These are first-class specimens, correctly named, and are suitable for schools or private cabinets.

L. E. RICKSECKER, Occidental, Sonoma Co., Cal.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

Hybrid cocoons ex *Ceanothi et Cecropia* now for sale or exchange for rare, perfect *Sphingidæ*, *Arctiidæ*, *Bombycidæ*, *Catocalæ* and *Diurni* not in my collection. Dr. Richard E. Kunze, 606 Third Avenue, New York.

Wanted.—Coleoptera and Lepidoptera from all sections. Will exchange works on Entomology, Zoology, Botany, and works relating to the languages of the N. A. Indian. Send for list. Wm. D. Doan, Box 377, Coatesville, Penn.

Hesperidæ.—A few *P. viator*; also *P. dion* and *Grapta j-album* to exchange for desirable Hesperidæ. H. E. Wilford, Batavia, N. Y.

Exotic Ichneumonidæ.—Would like to exchange North American Ichneumonidæ for correctly determined exotic species of the family. G. C. Davis, Agricultural College, Ingham Co., Michigan.

Duplicates.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). Desiderata.—Correctly named types of American and Canadian Coleoptera and Diurni. Arthur Ford, Glenmount, 107 Braybrooke Road, Hastings, Sussex, England.

Wanted.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica*. Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. Weith, Elkhart, Ind.

Wanted —I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. Wickham, Iowa City, Iowa.

Prof. J. B. Smith, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

Spiders.—I wish to obtain American Spiders, and will exchange or name and return duplicate species. Nathan Banks, Sea Cliff, Queen's Co., N. Y.

Coleoptera —I have about 1,500 species in duplicate and solicit exchanges, especially in Chrysomelidæ. Charles W. Lang, P. O. Box 3565, New York.

Myriopoda.—N. A. Myriopods wanted in exchange for insects of any order in this locality. Correspondence solicited. Howard Evarts Weed, Agricultural College, Miss.

Coleoptera of North America and Mexico wanted by purchase or exchange (large collection). Fred. C. Bowditch, Tappan St., Brookline, Norfolk Co., Mass., U. S. A.

Canadian Hymenoptera Wanted—Named or unnamed, for examination or in exchange. Correspondence desired with collectors in the Eastern and Western Provinces. W. Hague Harrington, Post Office Department, Ottawa.

Phryganidæ Wanted.—Will exchange choice Coleoptera and Lepidoptera from Kansas, Colorado and New Mexico (Prof. F. H. Snow's collecting) for Caddise-flies, U. S. or exotic. Vernon L. Kellogg, University of Kansas, Lawrence, Kansas

ECPANTHERIA -:- SCRIBONIA!

We wish to obtain Live Larvæ or Pupæ of this Moth, either by purchase or exchange.

-:- -:- FIELD BROTHERS, Milton, Mass.

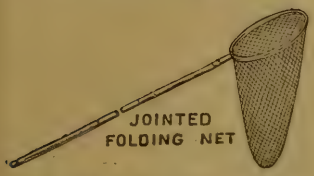
THE CANADIAN BEE JOURNAL

Published Monthly. Price, $1 per Annum in Advance.

Sample copies free. Edited by R. F. Holtermann.

Address: GOOLD, SHAPLEY & MUIR CO. (Ltd.), Publishers, Brantford, Ont.

A. SMITH & SONS, 121 NASSAU STREET, New York.



MANUFACTURERS AND IMPORTERS OF

GOODS FOR ENTOMOLOGISTS,

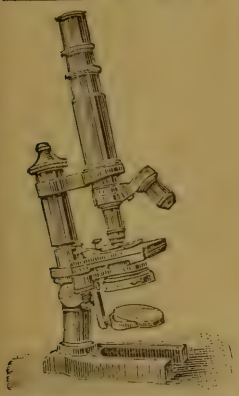
Klaeger and Carlsbad Insect Pins, Setting Boards, Folding Nets, Locality and Special Labels, Forceps, Sheet Cork, Etc. Other articles are being added, Send for List.

FOR SALE.

—SPECIMENS OF—

Japanese Lepidoptera, Orthoptera Coleoptera, Hymenoptera, Shells, Etc.

REV. H. LOOMIS, Yokohama, Japan.



LEITZ'S MICROSCOPES

Used by the Principal Universities and Schools of the Dominion.

RANGE IN PRICE FROM $21 TO $175

An Illustrated Catalogue on Application.

LYMAN SONS & CO.,

MONTREAL,

-:- -:- -:- -:- **Agents for the Dominion of Canada.**

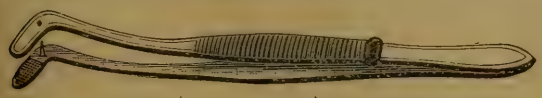
BUTTERFLIES OF NORTH AMERICA.

Part XIII., Vol. 3, will issue 1st October, 1892. Contents: *Chionobas Calais; C. Jutta*, and all stages: *C. Crambis; C. Brucei*, and all stages. Three plates. Price, $2.25. Vol. I., bound, $40; Vol. II., bound, $45.

Apply to HOUGHTON, MIFFLIN & CO., CAMBRIDGE, MASS.

JOHN AKHURST,

TAXIDERMIST AND DEALER IN ENTOMOLOGICAL SUPPLIES.



IMPROVED ENTOMOLOGICAL FORCEPS.

Fine Carlsbader Insect Pins a specialty. Price List sent on application.

78 Ashland Place,
BROOKLYN, N. Y.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—J. FLETCHER, Ottawa; H. H. LYMAN, Montreal; REV. T. W. FYLES, South Quebec; J. H. BOWMAN, London.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members.....$1 00
For Associate Members in the United States..... 1 00
For Associate Members in England and elsewhere..... 1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, P. O. Order, Canadian, U. S. or English Stamps. Cheques on local banks not received, unless 25c. is added for collecting.

J. A. BALKWILL, Treasurer.

All remittances, business communications and exchanges should be addressed to

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

All manuscript for publication, books for review, etc., should be sent to the General Editor, Port Hope, Ont.

ADVERTISING RATES.

Payable Strictly in Advance.

For each insertion, per inch .....$ 50
One inch per year..... .... 4 00
Half page, " 10 00
Whole " " 15 00

Canadian Entomologist.—The back volumes 1 to 24 can be supplied at $1 each and cost of transportation (postage 3 cts. a volume to Canada and United States, and registration fee 5c. on each package of six volumes or less). Single copies, 10c. each.

Annual Reports.—1870 to 1872 inclusive are out of print; later numbers can be supplied at 50 cents each, except the 8th, and 2 cts. postage to Canada and United States.

SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage 3 cts. per 500, to Canada and United States, and registration fee 5c.

CORK.—¼ inch, 25 cts. per square foot; postage 5 cts; ⅛ inch, 15 cts. per square foot; postage 3 cts. a foot to Canada and United States, and registration fee 5c.

LIST OF LABELS FOR CANADIAN COLEOPTERA FOR CABINET USE.—This list is based upon Henshaw's List of 1885, and the supplement, 1887, and has a synonymical list connecting by number the names of the old list (after Crotch) to those of the new, in such cases as the change is too great to allow of the ready recognition of the new name. These lists will be supplied to members at 25c. per set of 26 sheets, post-paid. Address,

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

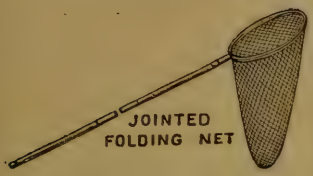
THE CANADIAN BEE JOURNAL

Published Monthly. Price, $1 per Annum in Advance.

Sample copies free. Edited by R. F. Holtermann.

Address: GOULD, SHAPLEY & MUIR CO. (Ltd.), Publishers, Brantford, Ont.

A. SMITH & SONS, 121 NASSAU STREET, New York.



MANUFACTURERS AND IMPORTERS OF

GOODS FOR ENTOMOLOGISTS,

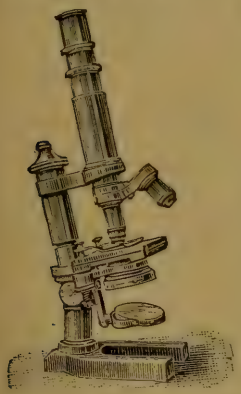
Klaeger and Carlsbad Insect Pins, Setting Boards, Folding Nets, Locality and Special Labels, Forceps, Sheet Cork, Etc. Other articles are being added, Send for List.

FOR SALE.

—SPECIMENS OF—

Japanese Lepidoptera, Orthoptera Coleoptera, Hymenoptera, Shells, Etc.

REV. H. LOOMIS, Yokohama, Japan.



LEITZ'S MICROSCOPES

Used by the Principal Universities and Schools of the Dominion.

RANGE IN PRICE FROM $21 TO $175

An Illustrated Catalogue on Application.

LYMAN SONS & CO.,

MONTREAL,

-:- -:- -:- -:- **Agents for the Dominion of Canada.**

BUTTERFLIES OF NORTH AMERICA.

Apply to HOUGHTON, MIFFLIN & CO., CAMBRIDGE, MASS.

JOHN AKHURST,

TAXIDERMIST AND DEALER IN ENTOMOLOGICAL SUPPLIES.

IMPROVED ENTOMOLOGICAL FORCEPS.

Fine Carlsbader Insect Pins a specialty. Price List sent on application.

78 Ashland Place,
BROOKLYN, N. Y.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—J. FLETCHER, Ottawa; H. H. LYMAN, Montreal; REV. T. W. FYLES, South Quebec; J. H. BOWMAN, London.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members.....$1 00
For Associate Members in the United States..... 1 00
For Associate Members in England and elsewhere..... 1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, P. O. Order, Canadian, U. S. or English Stamps. Cheques on local banks not received, unless 25c. is added for collecting.

J. A. BALKWILL, Treasurer.

All remittances, business communications and exchanges should be addressed to

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

All manuscript for publication, books for review, etc., should be sent to the General Editor, Port Hope, Ont.

ADVERTISING RATES.
Payable Strictly in Advance.

For each insertion, per inch .....$ 50
One inch per year..... 4 00
Half page, " 10 00
Whole " " 15 00

Canadian Entomologist.—The back volumes 1 to 24 can be supplied at $1 each and cost of transportation (postage 3 cts. a volume to Canada and United States, and registration fee 5c. on each package of six volumes or less). Single copies, 10c. each.

Annual Reports.—1870 to 1872 inclusive are out of print; later numbers can be supplied at 50 cents each, except the 8th, and 2 cts. postage to Canada and United States.

SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage 3 cts. per 500, to Canada and United States, and registration fee 5c.

CORK.—¼ inch, 25 cts. per square foot; postage 5 cts; ⅛ inch, 15 cts. per square foot; postage 3 cts. a foot to Canada and United States, and registration fee 5c.

LIST OF LABELS FOR CANADIAN COLEOPTERA FOR CABINET USE.—This list is based upon Henshaw's List of 1885, and the supplement, 1887, and has a synonymical list connecting by number the names of the old list (after Crotch) to those of the new, in such cases as the change is too great to allow of the ready recognition of the new name. These lists will be supplied to members at 25c. per set of 26 sheets, post-paid. Address,

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

No. 12.

THE

Canadian Entomologist

VOLUME XXV.

EDITED BY

REV. C. J. S. BETHUNE,

PORT HOPE, ONTARIO.

DECEMBER, - 1893.

LONDON:
LONDON PRINTING AND LITHOGRAPHING CO.
1893.

ENTOMOLOGICAL BOOKS.

A large stock in all the orders always in hand. Catalogues will be sent on application to **DULAU & CO.,**

37 Soho Square, London, W., England.

EXCHANGE.

Subscribers are invited to make liberal use of this column. Notices over three lines are liable to be shortened if necessary. All insertions free to subscribers.

LEPIDOPTERA.—Over 3,000 duplicates for exchange. Send lists to P. C. TRUMAN, Volga, South Dakota.

Correspondence and exchange of insects desired with young entomologists, especially in the Southern and Western States. STEWART N. DUNNING, 43 Niles Street, Hartford, Conn.

LEPIDOPTERA.—I have for exchange a large number of duplicates of last summer's collecting. Please write for list. Also cocoons of Cecropia and Polyphomus. JAMES TOUGH, 234 S. Water St., Chicago.

Bred specimens of Actias Selene; bybrids from Luna et Selene, Gloveri et Cecropia, Ceanothi et Cecropia, and other rare moths. Cocoons of Luna, Angulifera and P. Puthecium. EMILY L. MORTON, Newburgh, N. Y., New Windsor Delivery.

LEPIDOPTERA.—Wanted specimens of all kinds of butterflies and moths from Canada and the Rocky Mountains. Will make liberal exchanges. A. S. VAN WINKLE, Keota, Iowa.

HYBRID COCOONS ex *Ceanothi et Cecropia* now for sale or exchange for rare, perfect *Sphingidæ*, *Arctiidæ*, *Bombycidæ*, *Catocalæ* and *Diurni* not in my collection. DR. RICHARD E. KUNZE, 606 Third Avenue, New York.

WANTED.—Coleoptera and Lepidoptera from all sections. Will exchange works on Entomology, Zoology, Botany, and works relating to the languages of the N. A. Indian. Send for list. WM. D. DOAN, Box 377, Coatesville, Penn.

HESPERIDÆ.—A few *P. viator;* also *P. dion* and *Grapta j-album* to exchange for desirable Hesperidæ. H. E. WILFORD, Batavia, N. Y.

EXOTIC ICHNEUMONIDÆ.—Would like to exchange North American Ichneumonidæ for correctly determined exotic species of the family. G. C. DAVIS, Agricultural College, Ingham Co., Michigan.

DUPLICATES.—A large number of correctly named and well-set British Coleoptera, also British Lepidoptera (unset). DESIDERATA.—Correctly named types of American and Canadian Coleoptera and Diurni. ARTHUR FORD, Glenmount, 107 Braybrooke Road, Hastings, Sussex, England.

WANTED.—*Amblychila cylindriformis*, *Lucanus elaphus*, *Tatracha virginica*. Will give liberal exchange for them in European Lepidoptera in papers; have also perfect specimens stretched of *Acherontia Atropos*, *Saturnio pyri*, etc. Address, R. J. WEITH, Elkhart, Ind.

WANTED —I wish to obtain any Entomological Literature, especially that treating of Coleoptera, not already in my possession. In exchange for such, in any language, I offer good material from the West and far North, especially Coleoptera. H. F. WICKHAM, Iowa City, Iowa.

PROF. J. B. SMITH, New Brunswick, N. J., is engaged in a monographic revision of the Deltoid group of the Noctuidæ, and desires material from all parts of the country. He will name and return all material sent him, for the privilege of retaining such specimens as may be needed for description or for completing the collection of the U. S. National Museum.

BUTTERFLIES OF NORTH AMERICA.

Part XIV., Vol. 3, will issue 1st November, 1893. Contents :- Neominois Ridingsii, and all stages ; Chionobas Œno ; Chionobas Macounii and stages. Three plates. Price, $2.25. Vol. I., bound, $40 ; Vol. II., $45.

Apply to HOUGHTON, MIFFLIN & CO., CAMBRIDGE, MASS.

: NEW EDITION :

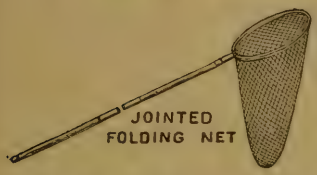
OF

J. HÜBNER'S SAMMLUNG EXOTISCHER SCHMETTERLINGE (Exotic Butterflies)

Subscription price, $130 for the whole work, which includes 664 coloured plates. This new edition is published in parts of ten coloured plates each at $1.35. Specimens of etchings sent post free on demand.

P. WYTSMAN, Scientific Booksel'er, 1 rue del'Arbre, Brussels (Belgium).

A. SMITH & SONS, 121 NASSAU STREET, New York.



MANUFACTURERS AND IMPORTERS OF

GOODS FOR ENTOMOLOGISTS,

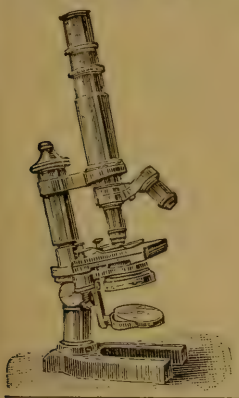
Klaeger and Carlsbad Insect Pins, Setting Boards, Folding Nets, Locality and Special Labels, Forceps, Sheet Cork, Etc. Other articles are being added. Send for List.

FOR SALE.

—SPECIMENS OF—

Japanese Lepidoptera, Orthoptera Coleoptera, Hymenoptera, Shells, Etc.

REV. H. LOOMIS, Yokohama, Japan.



LEITZ'S MICROSCOPES

Used by the Principal Universities and Schools of the Dominion.

RANGE IN PRICE FROM $21 TO $175

An Illustrated Catalogue on Application.

LYMAN SONS & CO.,

MONTREAL,

-:- -:- -:- -:- **Agents for the Dominion of Canada.**

PACIFIC - COAST - COLEOPTERA

—o—o—o—o—o—o—

Send for new list (No. 12), giving names and prices of six collections of fifty species (200 specimens) each, for from $2 to $10 per collection. These are first-class specimens, correctly named, and are suitable for schools or private cabinets.

L. E. RICKSECKER, OCCIDENTAL, SONOMA CO., CAL.

JOHN AKHURST,

TAXIDERMIST AND DEALER IN ENTOMOLOGICAL SUPPLIES.

IMPROVED ENTOMOLOGICAL FORCEPS.

Fine Carlsbader Insect Pins a specialty. Price List sent on application.

78 Ashland Place,
BROOKLYN, N. Y.

THE CANADIAN ENTOMOLOGIST.

Published by the Entomological Society of Ontario.

General Editor—REV. C. J. S. BETHUNE, Port Hope, Ont.
Editing Committee—J. FLETCHER, Ottawa; H. H. LYMAN, Montreal; REV. T. W. FYLES, South Quebec; J. H. BOWMAN, London.

ANNUAL FEES OF MEMBERSHIP.

For Ordinary Members $1 00
For Associate Members in the United States 1 00
For Associate Members in England and elsewhere 1 25

The Fees are payable in advance on the 1st of January in each year, and their payment entitles the members to a copy of all the Society's publications during the year, including the Illustrated Annual Report made to the Ontario Government.

Remittances may be made in the form of Express Order, P. O. Order, Canadian, U. S. or English Stamps. Cheques on local banks not received, unless 25c. is added for collecting.

J. A. BALKWILL, Treasurer.

All remittances, business communications and exchanges should be addressed to

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.

All manuscript for publication, books for review, etc., should be sent to the General Editor, Port Hope, Ont.

ADVERTISING RATES.

Payable Strictly in Advance.

For each insertion, per inch ..... $ 50
One inch per year 4 00
Half page, " 10 00
Whole " " 15 00

Canadian Entomologist.—The back volumes 1 to 24 can be supplied at $1 each and cost of transportation (postage 3 cts. a volume to Canada and United States, and registration fee 5c. on each package of six volumes or less). Single copies, 10c. each.

Annual Reports.—1870 to 1872 inclusive are out of print; later numbers can be supplied at 50 cents each, except the 8th, and 2 cts. postage to Canada and United States.

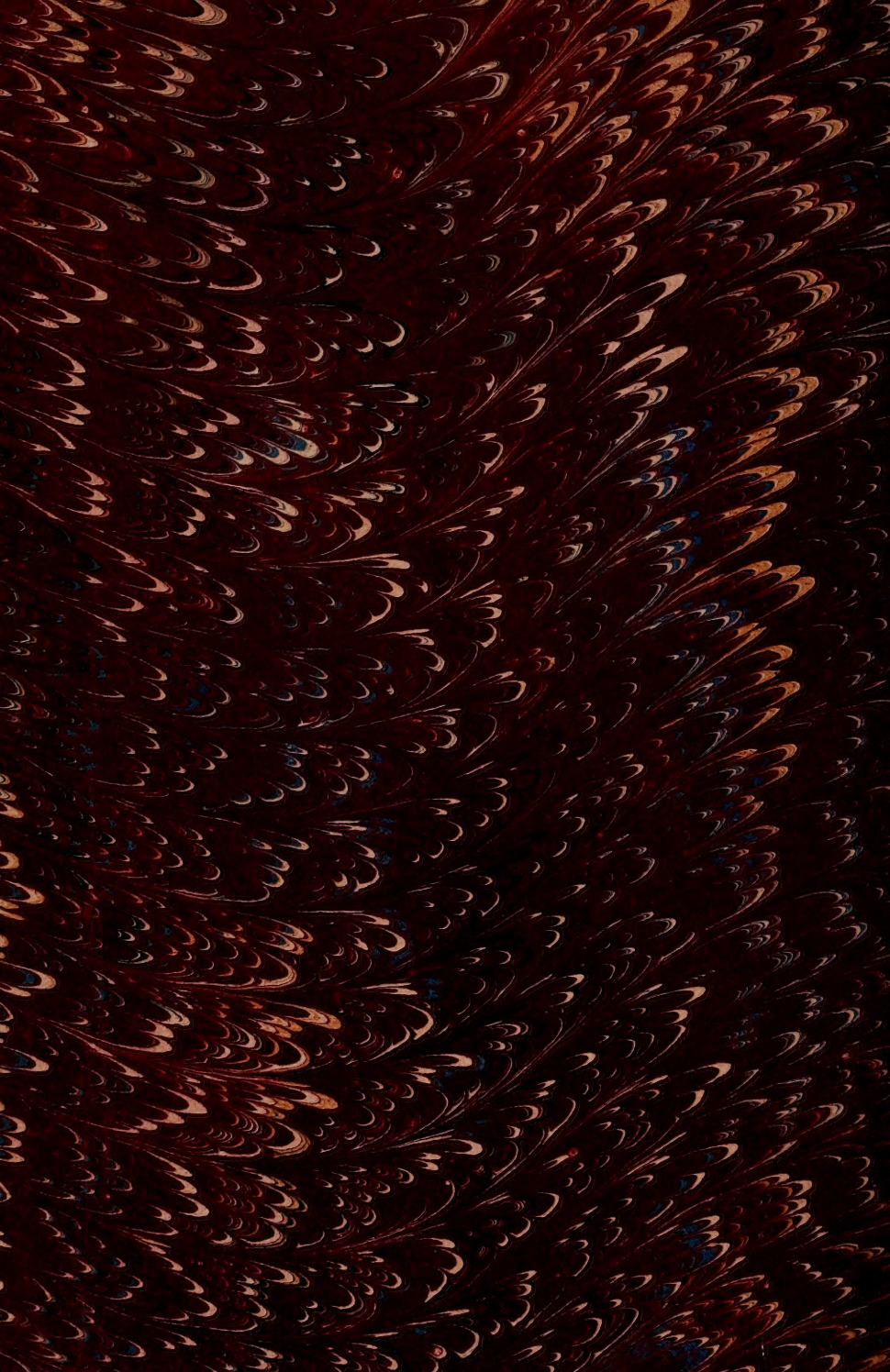
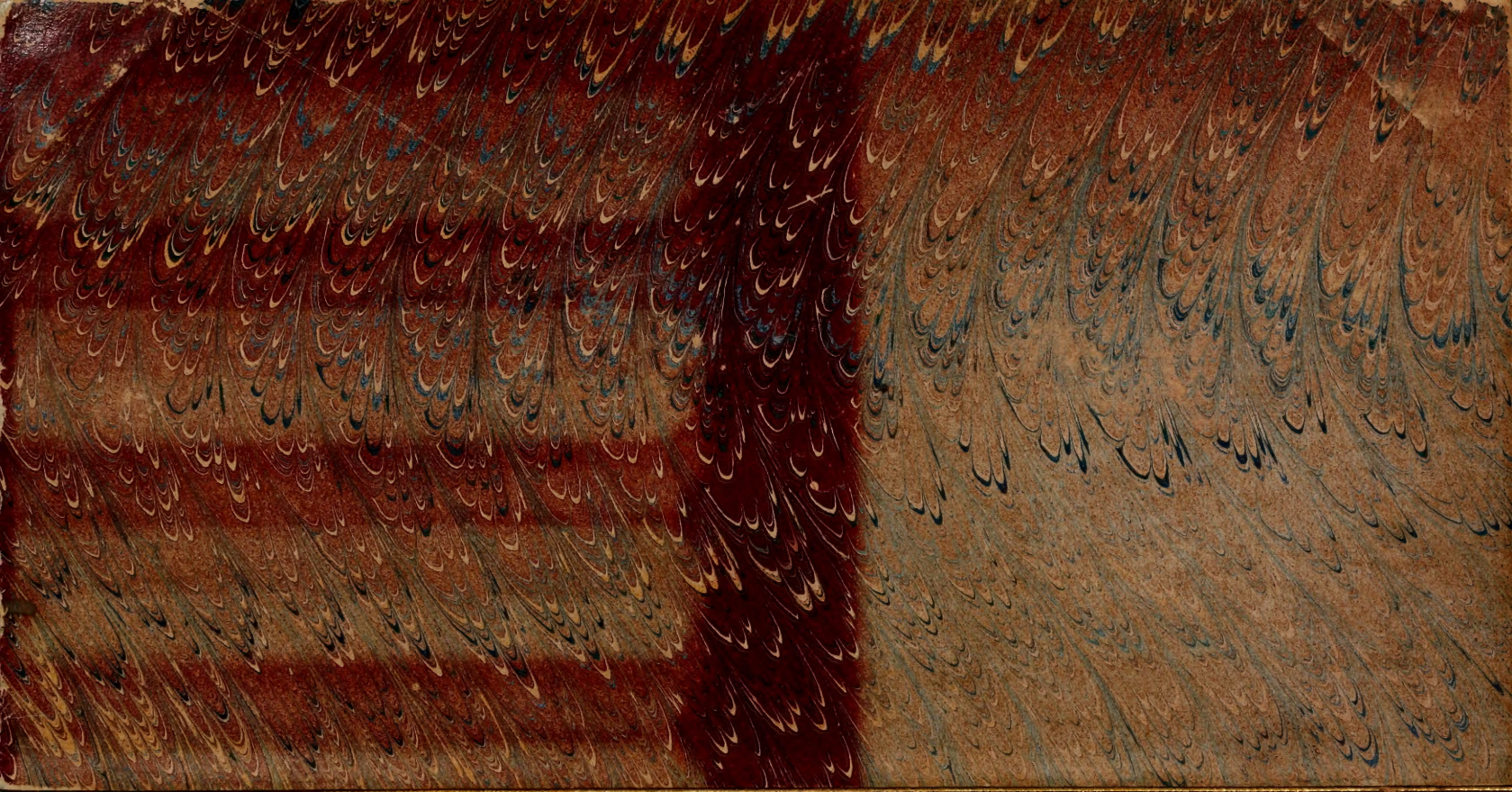
SUPPLIES FOR SALE.

ENTOMOLOGICAL PINS.—Nos. 00 to 5 inclusive, in packages of 500 each; Nos. 6, in packages of 250 $1 per 1000. Postage 3 cts. per 500, to Canada and United States, and registration fee 5c.

CORK.—¼ inch, 25 cts. per square foot; postage 5 cts; ⅛ inch, 15 cts. per square foot; postage 3 cts. a foot to Canada and United States, and registration fee 5c.

LIST OF LABELS FOR CANADIAN COLEOPTERA FOR CABINET USE.—This list is based upon Henshaw's List of 1885, and the supplement, 1887, and has a synonymical list connecting by number the names of the old list (after Crotch) to those of the new, in such cases as the change is too great to allow of the ready recognition of the new name. These lists will be supplied to members at 25c. per set of 26 sheets, post-paid. Address,

ENTOMOLOGICAL SOCIETY OF ONTARIO,
Victoria Hall, London, Ont.



MBL/WHOI LIBRARY
WH 19BF %